

MET Guide



Aeronautical Meteorological Information



GOBIERNO
DE ESPAÑA

MINISTERIO
PARA LA TRANSICIÓN ECOLÓGICA

AEmet
Agencia Estatal de Meteorología

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GLOSSARY OF TERMS

- ACC: Area control centre.
- AIREP: Air-report. See code.
- AEMET: Spanish State Meteorological Agency.
- AESA: Spanish Aviation Safety and Security Agency.
- AFTN: Aeronautical fixed telecommunication network.
- AIP: Aeronautical information publication.
- AIRMET: Warnings for low-level flights. See code.
- AMA: Aeronautical meteorological self-service.
- ANSMET: National Authority for Meteorological Supervision.
- ARS: Designator for special AIREP message.
- ATS: Air traffic service.
- DGAC: Spanish civil aviation authority.
- ENAIRE: Air navigation and aeronautical information service provider in Spain.
- FIR: Flight information region.
- FL: Flight level.
- GAMET: Area forecast for low-level flights. See code.
- IATA: International Air Transport Association.
- METAR: Aerodrome routine meteorological report. See code.
- METAR AUTO: METAR containing fully automated observations. See code.
- MSG: Meteosat second generation.
- OACI: International Civil Aviation Organization (ICAO).
- OMA: Aerodrome meteorological office.
- OMD: Defense meteorological office.
- OMM: World Meteorological Organization.
- OMPA: Main aeronautical meteorological Office.
- OPCU: Single european sky programme office.
- OVM: Meteorological watch office (MWO).
- RSS: Rapid scan service.
- RVR: Runway visual range.
- SAA: Aeronautical applications service.
- SIGMET: Warnings on en-route significant weather phenomena. See code.
- SIGWX: Chart of significant weather forecast for low-level flights.
- SPECI: Aerodrome special meteorological report. See code.
- TAF: Aerodrome forecast. See code.
- TMA: Terminal manoeuvring area.
- TREND: Tendency forecast . See code.
- UIR: Upper information region.
- UTC: Coordinated Universal Time.
- WAFC: World area forecast centre.

AERONAUTICAL METEOROLOGICAL SERVICE



The State Meteorological Agency of Spain (AEMET) operates under the Ministry for the Ecologic Transition through the State Secretary of Environment. The responsibility for the meteorological service, assigned to the Spanish State in the Article 149, 20th of the Spanish Constitution, is carried out by AEMET. The Article 8 of the *Real Decreto 186/2008*, on February 8th, in which the Statute of AEMET is approved, grants to AEMET the provision of weather and climate-related services, as well as the support to public and private activities entrusted to the Agency.

Therefore, as aeronautical meteorological authority in Spain, AEMET has the responsibility for providing weather-related services to support the air navigation in order to contribute to the safety, regularity and efficiency of air traffic.

Therefore, AEMET assumes the following responsibilities, among others:

- The provision of the necessary weather observation, watch, and forecast services in order to contribute to safety, regularity and efficiency air traffic.
- The provision of weather information to aviation users necessary to carry out their functions.

AEMET represents Spain at the World Meteorological Organization (WMO), as well as at the weather and communication groups of the International Civil Aviation Organization (ICAO). Every aeronautical weather-related product generated or internationally received by AEMET is disseminated by its Message Commutation System to AEMET's offices, to the Aeronautical Fixed Telecommunication Network (AFTN) through the leading air navigation and aeronautical information service provider in Spain (ENAIRES), to international weather databases, to the Aeronautical Meteorological Self-service (AMA), and to other aeronautical users.



In order to fulfil to the Single European Sky (SES) regulations, AEMET is immersed in a process to improve different products and services that are offered to aeronautical users, ensuring high quality procedures, updating all their systems and guaranteeing the availability and punctuality of the weather information provided.

In this context, AEMET now presents an updated version of the MET Guide for aeronautical meteorological information. This Guide includes updated information that was previously included in the Meteorological Services Guide for Air Navigation. So this unique guide is presented here, which supplies information about the products and services provided by AEMET to all aeronautical users, making easy the access to information and available data. This guide shows the structure of AEMET units related to aeronautical meteorological services and the variety of products available for aeronautical users.

ORGANIZATION OF THE AERONAUTICAL METEOROLOGICAL SERVICE

Almost every single unit in AEMET (communications, equipment, observation, etc.) carries out tasks in order to support air navigation, although direct support comes from Aerodrome Meteorological Offices (OMA), Main Aeronautical Meteorological Offices (OMPA), Meteorological Watch Offices (OVM), the Aeronautical Application Service (SAA), and the Single European Sky Programme Office (OPCU).

AERODROME METEOROLOGICAL OFFICES (OMA)

AEMET provides the observational service at the aerodromes through the observational staff at the OMA and the equipments installed in the aerodromes.

According to Annex 3 (ICAO), measurements of different meteorological variables are carried out (wind speed and direction, visibility, runway visual range, cloud amount, weather phenomena, temperature and atmospheric pressure).

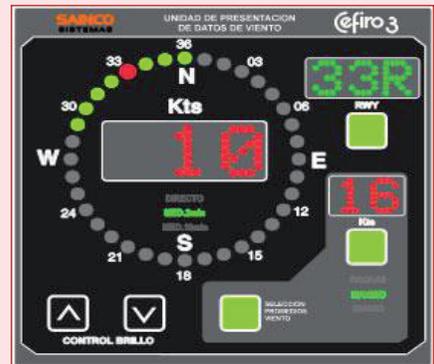
Automatic measurements, amongst which are wind speed and direction, runway visual range, height of cloud base, vertical visibility, temperature, humidity and atmospheric pressure, are obtained through different installed sensors, in accordance to the specifications from Annex 14 (ICAO).

The aerodrome observational products are the following:

- METAR or METAR AUTO
- SPECI
- Lightning detection warnings
- Different meteorological variable data measured by sensors

Measurements obtained by wind, temperature and pressure sensors are sent to the aerodrome control tower, where a graphical representation of the following variables is available in each control panel:

- Wind speed and direction in every runway.
- Instantaneous wind velocity.
- 2-minute averaged wind speed.
- Wind gusts.
- Instantaneous aerodrome temperature.
- Aerodrome QNH.



Besides 41 OMA, AEMET has 7 Defence Meteorological Offices (OMD) located in military aerodromes open to civil aviation. There are also several aerodromes and heliports with automatic equipment which provide weather information 24 hours a day (see Annex I).

The necessary weather service to carry out airport operations is provided by these offices. The beneficiaries of this service are flight crew members, air traffic services units and airport managements. Some of their duties are the following:

- Maintain continuous monitoring of the aerodrome weather, in order to warn aerodrome authorities of severe weather conditions that may have an impact on aircrafts on land, facilities or aerodrome services.
- Perform regular weather observations in the aerodrome with a fixed frequency (usually every thirty minutes), as well as special observations when substantial changes occur related to surface wind speed or direction, visibility, etc.
- Prepare ordinary and special coded reports (METAR-SPECI) based on observations that are disseminated, almost instantaneously, to every aeronautical user in the world.

ORGANIZATION OF THE AVIATION METEOROLOGICAL SERVICE

AERODROME METEOROLOGICAL OFFICES (OMA)

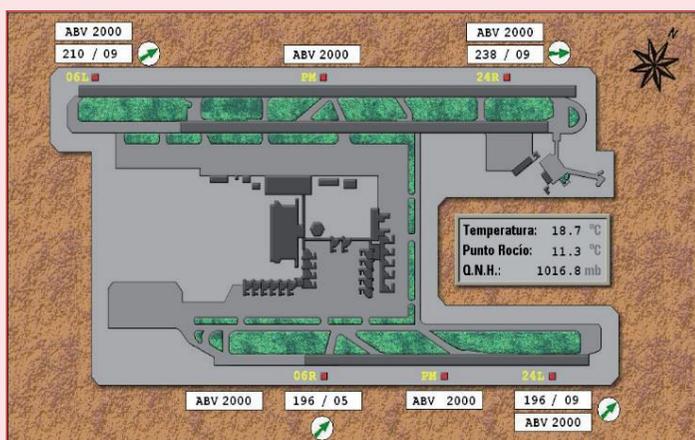
- Provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel. Flight documentation includes the following products:
 - a) Aerodrome reports, special reports and weather forecast at destination aerodromes and at those on route.
 - b) Wind and temperature charts at flight levels and en-route significant weather phenomena.
 - c) Information related to real or expected severe weather phenomena, either en-route or in the vicinity of airports, which may have an impact on the safety of either operations or aircrafts (SIGMET, AIRMET, advisory information on tropical cyclone or volcanic ash, etc.).
- Provision of Spanish aerodrome warnings to airport authorities, air traffic units, flight crew members and flight operators.
- Provision of the meteorological service required to satisfy the needs of local air traffic units
- Display meteorological information from satellite images, meteorological radars and the lightning detection network.

See the section "Meteorological information available at OMA" for more information.

MAIN AERONAUTICAL METEOROLOGICAL OFFICES (OMPA)

OMPA are the units responsible for the meteorological watch and forecast of the aerodromes under their charge, as well as for the support to the flight crew members when they wish to complete the meteorological information provided by any OMA. They are equipped with the most advanced technical resources, and are on duty 24 hours a day. AEMET has 5 OMPA: Madrid, Santander, Sevilla, Valencia and Las Palmas. Contact details of these offices are available in Annex II. They carry out the following activities, among others:

- Continuous meteorological monitoring of the aerodromes under their charge and of the airspace of their coverage area, preparing and disseminating the corresponding meteorological warnings.
- Elaboration of the aerodrome forecast, with a validity of 9 hours (short TAF), or 24 hours, or 30 hours (long TAF).
- Elaboration of landing forecast (TREND) and forecast for take-off (in case of agreement with operators).
- Meteorological information support to air traffic units and general aviation.



ORGANIZATION OF THE AVIATION METEOROLOGICAL SERVICE

METEOROLOGICAL WATCH OFFICES (OVM)



The main duty of an OVM is the meteorological watch of weather phenomena that may affect air traffic operations in the Flight Information Regions (FIR) in Spain, and support the air traffic service. AEMET has two OVM: one located at the OMPA of Valencia, which is responsible for the FIR of Barcelona and the FIR of Madrid, and another one located at the OMPA of Las Palmas, which is responsible for the FIR of the Canary Islands.

The two OVM are entrusted with the following tasks:

- Prepare and disseminate meteorological warnings of either real or expected severe weather conditions (SIGMET) that may have an impact on any flight level in the corresponding FIR.
- Prepare and disseminate meteorological warnings of either real or expected severe weather conditions that may have an impact on low flight level (AIRMET) in the corresponding FIR.
- Prepare and disseminate area forecast for low-level flights (GAMET).
- Prepare and disseminate global forecasts of significant weather phenomena (SIGWX, from surface to FL150).
- Disseminate special AIREP (air-report) based on information received by the area control centres to which aircrafts send the information.

The following map shows a geographical distribution of all AEMET offices: OMA, OMPA and OVM.:



ORGANIZATION OF THE AVIATION METEOROLOGICAL SERVICE

AERONAUTICAL APPLICATIONS SERVICE (SAA)

The Aeronautical Applications Service (SAA), under Single European Sky Programme Office (OPCU), actively participates in the provision of meteorological support to air navigation in order to cooperate in the safety, security, efficiency and economy of its activities.

The SAA is responsible for:

- Supervising the meteorological activities for air navigation.
- Applying the updated national and international regulations related to the meteorological service for air navigation through the elaboration of procedures, instructions, guides, technical specifications, etc., that must be fulfilled by the corresponding operational units (OMPA, OMA, OVM).
- Promoting and taking part in training, updating and specialization courses.
- Taking part in workgroups with aeronautical users.
- Designing products of aeronautical meteorology necessary for both operational meteorology and user requests.
- Participating in the preparation of the necessary regulations for the proper functioning of AEMET aeronautical offices and monitor the fulfillment of the criteria that regulate the coding and emission of aeronautical products, establishing the necessary control procedures, and making the periodic reports that are established.
- Representation of AEMET in the aeronautical meteorology commissions of WMO and ICAO, among others.
- Managing the maintenance and improvement of the Aeronautical Meteorological Self-service (AMA).

SINGLE EUROPEAN SKY PROGRAMME OFFICE (OPCU)

This office is in charge of the following duties:

- Relationship with the following aeronautical users:
 - Air operators.
 - Airport managers.
 - Air navigation service providers.
 - Professional associations (pilots, airlines, air traffic controllers, etc.)
 - Civil aviation authorities (ICAO, DGAC and AESA) and ANSMET.
- Supervising the correct application of national and international aeronautical regulations related to the provision of meteorological services for air navigation.
- Coordinating processes of certification and audit carried out by ANSMET.
- Negotiating agreements with aeronautical users and other air navigations service providers.
- Organization of technical sessions of aeronautical meteorology about any topic of interest to users in order to meet their needs.
- Evaluating the grade of satisfaction of the users with respect to the provided services in order to set up actions to improve the service, as well as collecting and processing new provisions of services.



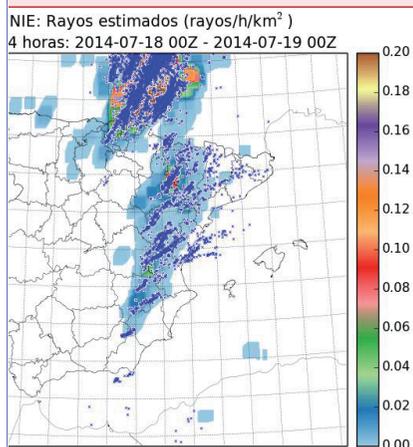
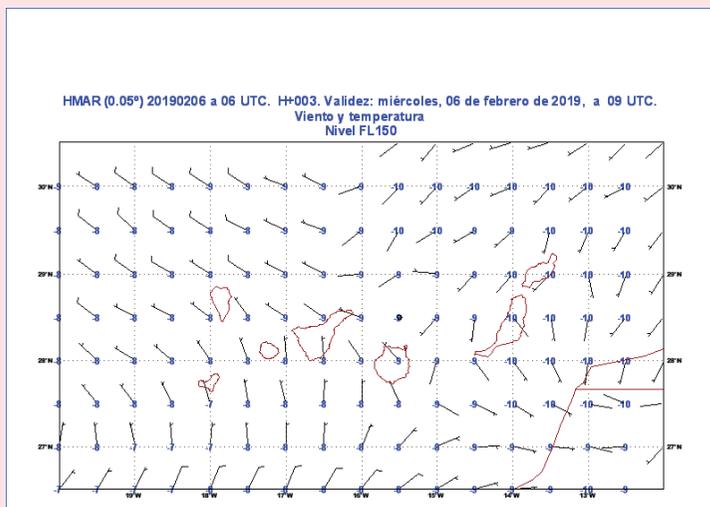
AERONAUTICAL METEOROLOGICAL SELF-SERVICE (AMA)

- Significant weather charts, wind and temperature charts, and humidity charts, in altitude for four runs times (0Z, 6Z, 12Z, 18Z), three forecast ranges (H+12, H+18, H+24), for the specified areas and levels of the following ICAO regions:
 - a) EUR (Europe): Significant weather, tropopause and maximum wind speed FL100-450
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180
 - b) EURAFI (Europe-Africa): Significant weather, tropopause and maximum wind speed FL250-630
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180
 - c) NAT (North Atlantic): Significant Weather, tropopause and maximum wind speed FL250-630
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180
 - d) MID (Middle East): Significant Weather, tropopause and maximum wind speed FL100-450
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180
 - e) EURSAM (Europe-South America): Significant Weather, tropopause and maximum wind speed FL250-630
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180
 - f) ASIA (Asia): Significant Weather, tropopause and maximum wind speed FL250-630
Wind and temperature in 17 levels, from FL050 to FL530
Humidity in 5 levels, from FL050 to FL180

Additional information

It is possible to get access, through different links, to additional meteorological information that could help to achieve a better flight planning or interpret any received documentation. For example, the following:

- ICAO located codes for countries , FIR and aerodromes, and IATA codes.
- A guide to understand the aeronautical meteorological information available in AMA, as well as the services provided by AEMET to the aeronautical users.
- Aeronautical climatologies of Spanish aerodromes.
- Decoding of METAR, TAF and aerodrome warnings to natural language.



AERONAUTICAL CLIMATOLOGICAL INFORMATION

An aeronautical climatology is a technical document that presents the average conditions of meteorological variables of interest for aeronautical users at a specific aerodrome.

The relative frequencies and mean values of the following meteorological variables are presented in data table format:

- Wind velocity, plus its components parallel and perpendicular to the runway.
- Visibility.
- Runway visual range (RVR).
- Height of the lowest layer of clouds that covers more than half of the sky.
- Temperature.
- Mean QNH.
- Significant weather phenomena: precipitation, thunderstorms and causes of visibility reduction to 5000 m or below.

The aerodrome reference temperature is indicated as well.

Aeronautical climatologies are elaborated for every aerodrome which has, at least, five years of observations based on ordinary METAR reports.

For consultation, access through AMA is available.



AERODROME OBSERVATION (METAR/SPECI)

SPECIFICATIONS OF SYMBOLIC LETTERS		
$V_N V_N V_N V_N D_v$	$V_N V_N V_N V_N$ Dv	<p>Minimum visibility</p> <p>When the horizontal visibility is not the same in different directions and when the minimum visibility is different from the prevailing visibility, and less than 1500 m or less than 50% of the prevailing visibility, and less than 5000 m.</p> <p>Direction of minimum visibility with respect to one of the eight directions of the compass (if known)</p>
$RD_R D_R / V_R V_R V_R V_R i$	R D _R D _R V _R V _R V _R V _R i	<p>Runway Visual Range (RVR)</p> <p>Group indicator.</p> <p>Runway designator (parallel runways should be distinguished by appending L = Left, C = Centre or R = Right).</p> <p>Mean value of RVR over the 10-minute period immediately preceding the observation (in meters).</p> <p>Tendency of RVR over the 10-minute period immediately preceding the observation. If the runway visual range values during the 10-minute period preceding the observation show a distinct upward or downward tendency such that the mean during the first five minutes varies by 100 metres or more from the mean during the second five minutes of the period, this shall be indicated by i = U for upward and i = D for downward tendency of runway visual range values. When no distinct change in runway visual range is observed, i = N shall be used.</p> <p>Extreme values of runway visual range</p> <p>When actual RVR values are outside the measuring range of the observing system in use, the following procedure shall apply:</p> <ol style="list-style-type: none"> a) When the RVR is greater than the maximum value which can be assessed with the system in use, the group $V_R V_R V_R V_R$ shall be preceded by the letter indicator P ($PV_R V_R V_R V_R$) in which $V_R V_R V_R V_R$ is the highest value which can be assessed. When the RVR is assessed to be more than 2000 m, it shall be reported as P2000. b) When the RVR is below the minimum value which can be assessed with the system in use, the group $V_R V_R V_R V_R$ shall be preceded by the letter indicator M ($MV_R V_R V_R V_R$) in which $V_R V_R V_R V_R$ is the lowest value which can be assessed. When the RVR is assessed to be less than 50 m, it shall be reported as M0050.
w'w'		<p>Present weather phenomena observed at or near the aerodrome</p> <p>(See table 1)</p> <p>The w'w' group is formed by: intensity or proximity + descriptor + weather phenomenon. Up to three different groups can be included.</p>
$N_s N_s N_s h_s h_s h_s [cc]$	$N_s N_s N_s$ $h_s h_s h_s$ cc	<p>Cloud amount and cloud height (up to 4 groups)</p> <p>Cloud amount: FEW (few) = 1 to 2 oktas, SCT (scattered) = 3 to 4 oktas, BKN (broken) = 5 to 7 oktas, OVC (overcast) = 8 oktas.</p> <p>Height of cloud base in steps of 100 ft.</p> <p>Cloud type. Significant convective clouds CB (cumulonimbus) or TCU (cumulus congestus of great vertical extent).</p>
$VV h_s h_s h_s$	VV $h_s h_s h_s$	<p>Vertical visibility</p> <p>It replaces the cloud amount group when the sky is obscured and information on vertical visibility is available.</p> <p>Group indicator.</p> <p>Vertical visibility in units of hundreds of feet. When the sky is obscured and information on vertical visibility is not available the group shall read ///.</p>
NSC		<p>If there are no clouds below CAVOK reference height, no CB and no TCU, and no restriction on vertical visibility, and the abbreviation CAVOK is not appropriate, then the abbreviation NSC shall be used.</p>

AERODROME OBSERVATION (METAR/SPECI)

SPECIFICATIONS OF SYMBOLIC LETTERS		
T'T'/T'dT'd	T'T' T'dT'd	<p>Temperature and dew-point temperature</p> <p>Observed air temperature rounded to the nearest whole degree Celsius</p> <p>Observed dew-point temperature rounded to the nearest whole degree Celsius.</p> <p>Temperatures below 0°C shall be immediately preceded by M.</p>
QP _H P _H P _H P _H	Q P _H P _H P _H P _H	<p>QNH</p> <p>Group indicator.</p> <p>QNH value rounded down to the nearest whole hectopascal.</p>
REw'w'	RE w'w'	<p>Recent weather phenomena of operational significance. (up to 3 groups)</p> <p>Group indicator.</p> <p>Weather phenomena observed during the period since the last routine report, or last hour, whichever is shorter, but not at the time of observation. No intensity of the recent weather phenomena shall be indicated. Abbreviations from Table 1 shall be used for the following phenomena:</p> <ul style="list-style-type: none"> - Freezing precipitation: REFZDZ, REFZRA - Moderate or heavy precipitation (including showers): REDZ, RESG, RERA, RESN, RESHRA, RESHSN, RESHGR, RESHGS, REPL - Blowing snow: REBLSN - Sandstorm or duststorm: REDS, RESS - Thunderstorm: RETS, RETSRA, RETSSN, RETSGR, RETSGS - Funnel cloud(s) (tornado or waterspout): REFC - Volcanic ash: REVA <p>When an automatic observing system is used and when the type of the precipitation cannot be identified by this system, the abbreviation REUP shall be used for recent precipitation.</p>
WS RD _R D _R o WS ALL RWY	WS RD _R D _R ALL RWY	<p>Wind shear in the layer below 500 meters</p> <p>Group indicator.</p> <p>Runway indicator and runway designator (L= Left, C= Center, R= Right).</p> <p>If the wind shear along the take-off path or approach path is affecting all runways in the airport.</p>
(RD _R D _R /E _R C _R e _R e _R B _R B _R o RD _R D _R /CLR D// o R/SNOCLO)		<p>State of the runway (See Table 2)</p>
TREND		<p>See TREND code.</p>
RMK...		<p>Denotes the beginning of a section containing information included by national decision which shall not be disseminated internationally.</p>



AERODROME OBSERVATION (METAR/SPECI)

TABLE 1 *w'w'*: PRESENT AND FORECAST SIGNIFICANT WEATHER

QUALIFIER		WEATHER PHENOMENA		
INTENSITY OR PROXIMITY 1	DESCRIPTOR 2	PRECIPITATION 3	OBSCURATION 4	OTHER 5
- Light Moderate (no qualifier) + Heavy (well developed in the case of dust/sand and funnel clouds) VC In the vicinity	MI Shallow BC Patches PR Partial (covering part of the aerodrome) DR Low drifting (height < 2 m) BL Blowing (height ≥ 2 m) SH Shower(s) TS Thunderstorm FZ Freezing (supercooled)	DZ Drizzle RA Rain SN Snow SG Snow grains PL Ice pellets GR Hail GS Small hail and/or snow pellets	BR Mist FG Fog FU Smoke VA Volcanic ash DU Widespread dust SA Sand HZ Haze	PO Dust/sand whirls (dust devils) SQ Squalls FC Funnel cloud(s) (tornado or waterspout) SS Sandstorm DS Duststorm

The *w'w'* groups shall be constructed by considering columns 1 to 5 in the table above in sequence, that is, intensity, followed by description, followed by weather phenomena. Example: +SHRA (heavy shower(s) of rain).



AERODROME OBSERVATION (METAR/SPECI AUTO)

METAR: : Aerodrome routine meteorological report with fully automated observations. It is issued every half hour.

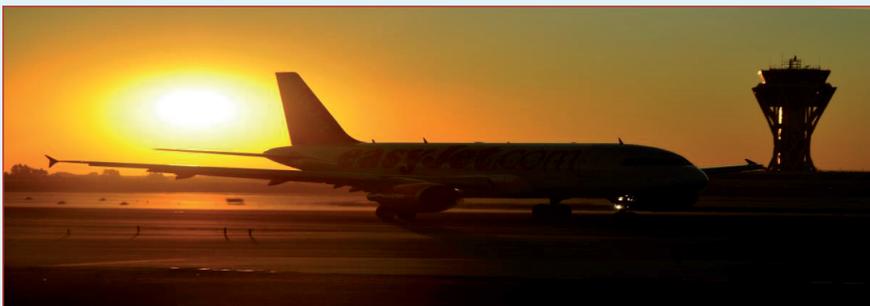
METAR or SPECI	CCCC YYGGggZ AUTO dddffG _m f _m KT d _n d _n d _n Vd _x d _x d _x	or	{ VVVV V _N V _N V _N V _N D _V RD _R D _R V _R V _R V _R i w'w' } or CAVOK	{ N _s N _s N _s h _s h _s h _s or N _s N _s N _s h _s h _s h _s /// and/ or ///TCU } or ///CB } VVh _s h _s h _s or VV/// or NSC or NCD
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T'T'/T'_dT'_d QP_HP_HP_HP_H REw'w' (RMK...)

SPECIFICATIONS OF SYMBOLIC LETTERS

(METAR AUTO symbols that are identical to those of METAR have the same meaning)

AUTO		Meteorological report with fully automated observations
w'w'		Present weather phenomena observed at or near the aerodrome (see Table 3). The w'w' group is formed by: intensity or proximity + descriptor + weather phenomenon. Up to three different groups can be included.
N _s N _s N _s h _s h _s h _s	N _s N _s N _s h _s h _s h _s	Cloud amount and cloud height Cloud amount: FEW (few) = 1 to 2 oktas, SCT (scattered) = 3 to 4 oktas, BKN (broken) = 5 to 7 oktas, OVC (overcast) = 8 oktas. Height of cloud base in steps of 100 ft.
N _s N _s N _s h _s h _s h _s ///		Symbols /// mean that there are convective clouds (TCU or CB) but it cannot be determined if they are linked to this layer.
///TCU		There are cumulus congestus of great vertical extent (TCU) but their amount and height cannot be determined
///CB		There are cumulonimbus clouds (CB) but their amount and height cannot be determined
VVh _s h _s h _s	VV h _s h _s h _s	Vertical visibility It replaces the cloud group when the sky is obscured and information on vertical visibility is available. Group indicator. Vertical visibility in hundreds of feet.
VV///		Vertical visibility whose height cannot be determined.
NSC		If there are no clouds below CAVOK reference height, no CB, no TCU and no restriction on vertical visibility, and the abbreviations CAVOK is not appropriate
NCD		No clouds are detected.



AERODROME OBSERVATION (METAR/SPECI AUTO)

TABLE 3 w'w': PRESENT SIGNIFICANT WEATHER FOR METAR AUTO

QUALIFIER		WEATHER PHENOMENA	
INTENSITY OR PROXIMITY 1	DESCRIPTOR 2	PRECIPITATION 3	OBSCURATION 4
- Light Moderate (no qualifier) + Heavy VC In the vicinity	BC Patches SH Shower(s) TS Thunderstorm FZ Freezing (supercooled)	DZ Drizzle RA Rain SN Snow GR Hail GS Small hail and/or snow pellets UP Unknown precipitation	BR Mist FG Fog FU Smoke DU Widespread dust HZ Haze

The w'w' groups shall be constructed by considering columns 1 to 4 in the table above in sequence, that is, intensity, followed by description, followed by weather phenomena. Example: +SHRA (heavy shower(s) of rain).

Comments on METAR AUTO

- The optional code word AUTO is inserted before the wind group when a report contains fully automated observations without human intervention.
- ICAO requirement is that all of the specified elements shall be reported. However, if any element cannot be observed, the group in which it would have been encoded shall be replaced by the appropriate number of solidi. The number of solidi depends on the number of symbolic letters for the specific group which is not able to be reported.

The coding of the groups is the same as in the non-automatic METAR. The abbreviations that are specific to the automatic METAR are the following:

- **UP**: When an automatic observing system is used and when the type of the precipitation cannot be identified by this system, the abbreviation UP is used for precipitation. The abbreviation UP may be combined, as necessary, with the following present weather: FZ (freezing) and TS (thunderstorm).
- **NCD**: When an automatic observing system is used and no clouds are detected by that system.
- **REUP, REFZUP, RETSUP**: For recent precipitation when an automatic observing system is used and when the type of the precipitation cannot be identified by this system.
- When cumulonimbus clouds or towering cumulus clouds are detected by the automatic observing system and the cloud amount and/or the height of cloud base cannot be observed, the cloud amount and/or the height of cloud base are replaced by /// (e.g.: ///CB, ///TCU).
- When the automatic observing system cannot assign the type of convective cloud detected to a specific layer of clouds, the cloud type is replaced by /// (e.g.: SCT020/// BKN025/// ///CB).
- When information on vertical visibility is not available the group shall read VV///.
- /////: When the cloud sensor is out of order.

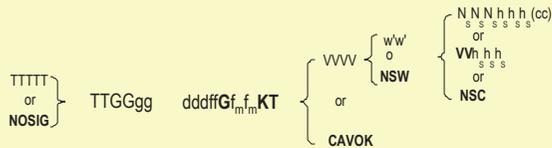
AERODROME OBSERVATION (METAR NIL)

METAR CCCC YYGGggZ NIL=

- The code **NIL** is placed right after the day/hour group in case of missing report.

TREND FORECAST (TREND)

TREND: It is a forecast for the next two hours from the time of the METAR or SPECI report. It contains concise information related to expected changes in weather conditions. This information is appended at the end of either a METAR or SPECI bulletin. The TREND informs about important changes in one or more of the following variables: Surface wind velocity, visibility, weather conditions and cloud amount or vertical visibility. If no change is expected the code word "NOSIG" is used.



NOTE 1: Only the groups of expected significant changes are included. However, in the case of significant changes of the clouds, all cloud groups, including any significant layer(s) or masses not expected to change, shall be given.

NOTE 2: The specific value of any of the elements and the time given in the forecast shall be understood by the recipient to be the most probable value which the element is likely to assume during the period of the forecast and the most probable time of occurrence.

SPECIFICATIONS OF SYMBOLIC LETTERS

TTTTT	<p>Change indicator (BECMG or TEMPO) for one or several of the observed elements</p> <p>BECMG: It is used to describe expected changes to meteorological conditions which reach or pass specified threshold criteria at either a regular or irregular rate.</p> <p>TEMPO: It is used to describe expected temporary fluctuations to meteorological conditions which reach or pass specified threshold criteria and last for a period of less than one hour in each instance and in the aggregate cover less than half of the forecast period during which the fluctuations are expected to occur.</p>
TTGGgg	<p>Indicator (TT) and time group (GGgg). Optional field.</p> <p>TT: FM (from), TL (until) or AT (at).</p> <p>GGgg: Time group (hours and minutes UTC).</p>
dddffGf _m KT	<p>Surface wind</p> <p>It indicates changes in observed wind direction and/or mean speed, according to some specified thresholds, as well as those values that are relevant in the operational task.</p>
VVVV	<p>Prevailing forecast visibility</p> <p>It indicates important changes in prevailing visibility considering some specified thresholds. It is specified in meters. The value 9999 indicates 10 km or above.</p>
w'w'	<p>Present weather phenomena</p> <p>It indicates the onset, cessation or change in intensity of the weather phenomena shown in Table 1 (present and forecast significant weather for METAR or SPECI).</p>
N _s N _s N _s h _s h _s h _s (cc) o VVh _s h _s h _s	<p>Cloud amount or vertical visibility</p> <p>It indicates changes, according to some specific thresholds, in the height of the layer of clouds and/or the amount of clouds, or the vertical visibility.</p>
CAVOK	<p>Code word CAVOK</p> <p>It applies when:</p> <ol style="list-style-type: none"> a) Visibility reported in the group VVVV is 10 km or more. b) No cloud below 1500 metres (5000 ft) and no CB and no TCU are present. c) No significant weather phenomena.
NSW	<p>End of significant weather phenomena w'w'.</p>
NSC	<p>If there are no clouds below CAVOK reference height, no CB, no TCU and no restriction on vertical visibility, and the abbreviations CAVOK is not appropriate.</p>
NOSIG	<p>None of the significant forecast weather is expected to change during the forecast time</p>

EXAMPLES OF METAR, METAR AUTO, SPECI AND TREND

EXAMPLE 1: METAR without TREND

METAR COR	LEAM	141200Z	21009K	6000	NSC	24/10	Q1008=
a	b	c	d	e	f	g	h

- a: Type of message: corrected METAR.
- b: ICAO location indicator: LEAM, Almería.
- c: Day and hour of observation 141200Z: 14th of the current month at 1200 UTC.
- d: Mean true direction and mean wind speed in 10 minutes: 210° and 9 kt.
- e: Prevailing visibility: 6000 m.
- f: Cloud height above 1500 m (5000 feet) or above CAVOK's reference height of the aerodrome, and no CB or TCU are present.
- g: Temperature and dew-point temperature 24/10: temperature +24°C, dew-point temperature +10°C.
- h: Mean sea-level pressure, in accordance with the International Standard Atmosphere (or QNH), 1008 hPa.

EXAMPLE 2: METAR with TREND = NOSIG

METAR	LEZL	150800Z	06003KT	350V100	6000	2000E	R27/0900U	PRFG	OVC009	13/13	Q1022	NOSIG=
	a	b	c		d	e	f	g	h	i	j	k

- a: ICAO location indicator: LEZL, Sevilla-San Pablo.
- b: Day and hour of observation 150800Z: 15th of the current month at 0800 UTC.
- c: Mean true direction and mean wind speed in 10 minutes: 60° variable between 350° y 100°; mean wind speed: 3 kt.
- d: Prevailing visibility: 6000 m.
- e: Minimum visibility: 2000 m to the East.
- f: Runway visual range R27/0900U: 900 m at runway 27 and increasing.
- g: Present significant weather PRFG: fog covering part of the aerodrome (Table 1).
- h: Cloud amount and cloud height OVC009: overcast sky (8 oktas) with the cloud base at 900 feet.
- i: Temperature and dew-point temperature 13/13: temperature +13°C, dew-point temperature +13°C.
- j: QNH, Q1022: 1022 hPa.
- k: Trend forecast NOSIG: no forecast significant change for the next 2 hours following the observation time (until 1000 UTC).

EXAMPLE 3: METAR with TREND = NOSIG

METAR	LEBB	160930Z	03008KT	3000	TSGRRA	SCT015TCU	BKN022CB	09/06	Q0993	NOSIG=
	a	b	c	d	e	f	g	h	i	j

- a: ICAO location indicator: LEBB, Bilbao.
- b: Day and hour of observation 160930Z: 16th of the current month at 0930 UTC.
- c: Mean true direction and mean wind speed in 10 minutes: 30°, 8 kt.
- d: Prevailing visibility: 3000 m.
- e: Present significant weather TSGRRA: moderate thunderstorm with both hail and rain, but prevailing hail (Table 1).
- f: Cloud amount and cloud height SCT015TCU (1st layer): 3 to 4 oktas of tower of cumulus and the cloud base at 1500 feet.
- g: Cloud amount and cloud height BKN022CB (2nd layer): 5 to 7 oktas of cumulonimbus and cloud base at 2200 feet.
- h: Temperature and dew-point temperature 09/06: temperature +9°C, dew-point temperature +6°C.
- i: QNH, Q0993: 993 hPa.
- j: Trend forecast NOSIG: no forecast significant change for the next 2 hours following the observation time (until 1130 UTC).

EXAMPLES OF METAR, METAR AUTO, SPECI AND TREND

EXAMPLE 4: METAR and TREND

METAR	LEST	201230Z	21010G25KT	180V250	2000	1200	R17/1300U	R35/P2000	+SHRA	FEW010CB
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>
	SCT017	BKN027	12/07	Q1002	RETSRA	WS R17	BECMG	7000	NSW	NSC=
	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>		

- a: ICAO location indicator: LEST, Santiago-Labacolla.
- b: Day and hour of observation 201230Z: 20th of the current month at 1230 UTC.
- c: Mean true direction and mean wind speed in 10 minutes: 210°, 10 kt, gusts of 25 kt.
- d: Total variation of wind direction 180V250: during the 10 minutes preceeding the observation wind direction has varied from 180° to 250°, being the mean wind speed 10 kt.
- e: Prevailing visibility: 2000 m.
- f: Minimum visibility: 1200 m.
- g: Runway visibility range R17/1300U: 1300 m at runway 17, increasing.
- h: Runway visibility range R35/P2000: P letter is added to indicate more than 2000 m at the runway 35.
- i: Present significant weather + SHRA: heavy showers of rain (Table 1).
- j: Cloud amount and cloud height FEW010CB (1st layer): 1 to 2 oktas of CB and the cloud base at 1000 feet.
- k: Cloud amount and cloud height SCT017 (2nd layer): 3 to 4 oktas and the cloud base at 1700 feet.
- l: Cloud amount and cloud height BKN027 (3rd layer): 5 to 7 oktas and the cloud base at 2700 feet.
- m: Temperature and dew-point temperature 12/07: temperature +12°C, dew-point temperature +7°C.
- n: QNH, Q1002: 1002 hPa.
- o: Recent weather phenomena RETSRA: recent thunderstorms of rain (but not at the time of observation) on the aerodrome.
- p: Wind shear WS R17: wind shear along the take-off path or approach path, or both, on the runway 17
- q: TREND forecast BECMG: expected changes to meteorological conditions.
- r: Forecasted variations of the preceding meteorological conditions 7000 NSW NSC: During the next two hours a visibility of 7 km is expected and no significant weather and clouds are forecasted

EXAMPLE 5: SPECI

SPECI	LEPP	050820Z	21015KT	1000	R15/0400U	R33/0600U	+SHSN	FEW015	BKN025CB
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>
	M03/M04	Q1000	R15/550493=						
	<i>j</i>	<i>k</i>	<i>l</i>						

- a: ICAO location indicator: LEPP, Pamplona.
- b: Day and hour of observation 050820Z: 5th of the current month at 0820 UTC.
- c: Mean true direction and mean wind speed in 10 minutes : 210° y 15 kt.
- d: Prevailing visibility : 1000 m.
- e: Runway visual range R15/0400U: 400 m at runway 15, increasing.
- f: Runway visual range R33/0600U: 600 m at runway 33, increasing.
- g: Present significant weather + SHSN: heavy showers of snow.
- h: Cloud amount and cloud height FEW015 (1st layer): 1 to 2 oktas and the cloud base at 1500 feet.
- i: Cloud amount and cloud height BKN025CB (2nd layer): 5 to 7 oktas of CB and the cloud base at 2500 feet.
- j: Temperature and dew-point temperature M03/M04: temperature −3°C, dew-point temperature −4°C.
- k: QNH, Q1000: 1000 hPa.
- l: State of the runway R15/550493 (Table 2, METAR/SPECI). Runway R15; 5: wet snow; 5: 26-50% of runway covered; 04: 4 mm of depth of deposit; 93: medium braking efficiency.

EXAMPLES OF METAR, METAR AUTO, SPECI AND TREND

EXAMPLE 6: **METAR AUTO**

METAR LEPP 230200Z AUTO 10002KT 3700 0800NW R33/1800U R15/P2000 -UP BCFG SCT003 BKN008
a b c d e f g h i j k
OVC014 01/01 Q1006=
L m n

- a: ICAO location indicator: LEPP, Pamplona.
- b: Day and hour of observation 230200Z: 23rd of the current month at 2 UTC.
- c: Code word AUTO: for a METAR AUTO report.
- d: Mean true direction and mean wind speed over in 10 minutes: 100°, 2 kt.
- e: Prevailing visibility: 3700 m. Minimum visibility of 800 m in Northwest direction.
- f: Runway visibility range R33/1800U: 1800 m at runway 33, increasing.
- g: Runway visibility range R15/P2000: more than 2000 m at runway 15.
- h: -UP: Light unknown precipitation.
- i: Fog banks.
- j: Cloud amount and cloud height SCT003 (1st layer): 3 to 4 oktas and the cloud base at 300 feet.
- k: Cloud amount and cloud height BKN008 (2nd layer): 5 to 7 oktas and the cloud base at 800 feet.
- l: Cloud amount and cloud height OVC014 (3rd layer): 8 oktas and the cloud base at 1400 feet.
- m: Temperature and dew-point temperature 01/01: temperature +1°C, dew-point temperature +1°C.
- n: QNH, Q1006: 1006 hPa.

EXAMPLE 7: **METAR AUTO**

METAR LEBG 022230Z AUTO 21017KT 9999 VCTS SCT023/// BKN029/// BKN050/// ///CB 06/05 Q0991=
a b c d e f g h i j k l

- a: ICAO location indicator: LEBG, Burgos.
- b: Day and hour of observation 022230Z: 2nd of the current month at 2230 UTC.
- c: Code word AUTO for a METAR AUTO report.
- d: Mean true direction and mean wind speed over in 10 minutes : 210° and 17 kt.
- e: Prevailing visibility 9999: more than 10 km.
- f: Present significant weather VCTS: thunderstorms in the vicinity.
- g: Cloud amount and cloud height SCT023/// (1st layer): 3 to 4 oktas and the cloud base at 2300 feet.
- h: Cloud amount and cloud height BKN029/// (2nd layer): 5 to 7 oktas and the cloud base at 2900 feet.
- i: Cloud amount and cloud height BKN050/// (3rd layer): 5 to 7 oktas and the cloud base at 5000 feet.
- j: Cloud amount and cloud height ///CB (4th layer, convective clouds): amount and height unknown. Height cannot be associated to any of the preceding layers.
- k: Temperature and dew-point temperature 06/05: temperature 6°C, dew-point temperature 5°C.
- l: QNH, Q0991: 991 hPa.

OBSERVING SYSTEMS



Visibility sensor FD12

Ceilometer CL31 for cloud height detection



Humidity and Temperature Probe HMP155

Automatic weather station



Indicators at an OMA



Wind Set WA15



AERODROME FORECAST (TAF)

TAF Concise statement of the expected meteorological conditions at an aerodrome for a specified period, including changes significant for the aircraft operations. The validity period of a routine TAF is 9 (short TAF), 24 or 30 (long TAF) hours. For a modified TAF (AMD), the validity period is reduced according to the time of issue of the modified TAF.

$$\text{TAF } \text{CCCC } \text{YYGGggZ } \left. \begin{array}{l} \text{Y}_1\text{Y}_1\text{G}_1\text{G}_1/\text{Y}_2\text{Y}_2\text{G}_2\text{G}_2 \\ \text{1 1 1 1 2 2 2 2} \end{array} \right\} \left. \begin{array}{l} \text{dddfGf f KT} \\ \text{m m} \end{array} \right\} \left\{ \begin{array}{l} \text{VVV} \\ \text{or} \\ \text{CAVOK} \end{array} \right\} \left\{ \begin{array}{l} \text{w'w'} \\ \text{or} \\ \text{NSC} \end{array} \right\} \left\{ \begin{array}{l} \text{N N N h h h (cc)} \\ \text{s s s s s s s} \\ \text{or} \\ \text{V V h h h} \\ \text{s s s} \\ \text{or} \\ \text{NSC} \end{array} \right\} \text{ (TX T}_F\text{T}_F/\text{Y}_F\text{Y}_F\text{G}_F\text{G}_F\text{Z } \text{TNT}_F\text{T}_F/\text{Y}_F\text{Y}_F\text{G}_F\text{G}_F\text{Z})$$

$$\left\{ \begin{array}{l} \text{PROBCC } \text{o} \\ \text{2 2} \\ \text{PROBCC } \text{TTTTT} \\ \text{2 2} \\ \text{or TTTTT} \\ \text{or} \\ \text{TTYGGgg} \end{array} \right\} \left. \begin{array}{l} \text{YYGG/Y}_e\text{Y}_e\text{G}_e\text{G}_e \\ \text{e e e e} \end{array} \right\} \left. \begin{array}{l} \text{dddfGf f KT} \\ \text{m m} \end{array} \right\} \left\{ \begin{array}{l} \text{VVV} \\ \text{or} \\ \text{CAVOK} \end{array} \right\} \left\{ \begin{array}{l} \text{w'w'} \\ \text{or} \\ \text{NSW} \end{array} \right\} \left\{ \begin{array}{l} \text{N N N h h h (cc)} \\ \text{s s s s s s s} \\ \text{or} \\ \text{V V h h h} \\ \text{s s s} \\ \text{or} \\ \text{NSC} \end{array} \right\}$$

NOTE 1: TAF COR is used for a corrected TAF and TAF AMD for an amended TAF.
 NOTE 2: The group enclosed in brackets for the temperature is used for long TAF.

SPECIFICATIONS OF SYMBOLIC LETTERS

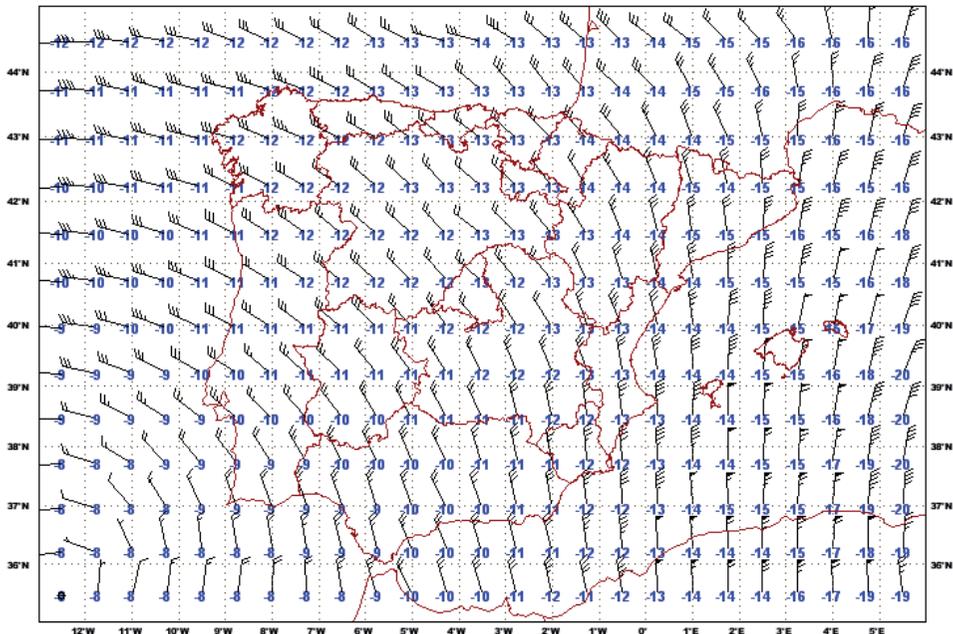
CCCC		ICAO location indicator of the aerodrome
YYGGggZ		The day of the month and the time of forecast
Y ₁ Y ₁ G ₁ G ₁ /Y ₂ Y ₂ G ₂ G ₂	Y ₁ Y ₁ G ₁ G ₁ Y ₂ Y ₂ G ₂ G ₂	Validity period of forecast Day and hour UTC of origin of forecast. Day and hour UTC of end of forecast.
dddfG _m f _m		Forecast wind on surface Information on forecast wind has the same format as in the METAR/SPECI code.
VVVV		Forecast prevailing visibility in meters It is given in meters, excepting 9999, which indicates a visibility of 10 km or more.
CAVOK		Code word CAVOK The code word CAVOK shall be included in place of the groups of visibility, significant weather and cloud amount or vertical visibility when certain conditions are forecast (see METAR code)
w'w'		Forecast significant weather It indicates forecast significant meteorological phenomena according to the abbreviations shown in table 1 of METAR/SPECI code.
NSW		End of significant weather phenomena w'w'.
N _s N _s N _s h _s h _s h _s (cc) VVh _s h _s h _s		Forecast cloud amount and cloud height Forecast vertical visibility Information on forecast cloud amount, cloud height and visibility has the same format as in the METAR/SPECI code
NSC		If there are no forecast clouds below CAVOK reference height, no forecast CB, no forecast TCU, and the abbreviations CAVOK is not appropriate
TX _F T _F /Y _F Y _F G _F G _F Z TNT _F T _F /Y _F Y _F G _F G _F Z	TX (TN) T _F T _F Y _F Y _F G _F G _F Z	Forecast maximum (minimum) temperature. It is included in the long TAF (24 or 30 hours). Letter indicator of maximum (minimum) temperature. Forecast maximum and minimum temperatures (in integer Celsius degrees) expected to occur during the period G ₁ G ₁ to G ₂ G ₂ . Temperatures below 0°C shall be preceded by the letter M, that is, minus. Day and hour UTC of forecast maximum and minimum temperatures expected to occur

AERODROME FORECAST (TAF)

SPECIFICATIONS OF SYMBOLIC LETTERS

PROBC₂C₂ YYGG/Y _e Y _e G _e G _e	PROBC ₂ C ₂ YYGG Y _e Y _e G _e G _e	<p>Significant changes in some or all the elements forecast</p> <p>Probability of occurrence in % (C₂C₂ = 30 or 40) of a forecast element significant to the aircraft operations. The group PROB shall be always followed by the time group YYGG/Y_eY_eG_eG_e or by the group TEMPO YYGG/Y_eY_eG_eG_e.</p> <p>Day and hour UTC of the origin of the period of the expected changes.</p> <p>Day and hour UTC of the end of the period of the expected changes.</p>
TTTT YYGG/Y _e Y _e G _e G _e	TTYGGgg	<p>The change group TTTT is used in the form of BECMG or TEMPO.</p> <p>The change indicator BECMG YYGG/Y_eY_eG_eG_e should be used to describe changes in the meteorological conditions at an unspecified time during the time period GG to G_eG_e. The time period should normally not exceed 2 hours but in any case should not exceed 4 hours.</p> <p>The change indicator TEMPO YYGG/Y_eY_eG_eG_e should be used to describe expected temporary fluctuations in the meteorological conditions at an unspecified time during the time period GG to G_eG_e. Following the change groups only elements that are expected to change significantly will be included.</p> <p>The time indicator group FMYGGgg shall be used to indicate the beginning of a self-contained part of the forecast indicated by YYGGgg. When the group FMYGGgg is used, all forecast conditions given before the group FMYGGgg are superseded by the conditions indicated after the group.</p>

HMAR (0.05°) 20190204 a 12 UTC. H+003. Validez: lunes, 04 de febrero de 2019, a 15 UTC.
Viento y temperatura
Nivel FL150



EXAMPLES OF TAF

EXAMPLE 1:

TAF OF 9 HOURS LONG

TAF	LEVS	100210Z	1003/1012	30010KT	7000	SHRA	FEW008	SCT015TCU	BKN025	TEMPO
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>
	1008/1010 3000 +SHRA PROB30 TEMPO 1010/1012 TSRA FEW008 BKN012CB BKN025= <div style="text-align: center;"><i>k</i></div>									

- a: ICAO location indicator: LEVS, Madrid/Cuatro Vientos.
- b: Day and time of the forecast 100210Z: Day 10th of the month at 0210 UTC.
- c: Period covered by the forecast 1003/1012: from 0300 UTC to 1200 UTC of 10th.
- d: Wind on surface: 300°, 10 kt.
- e: Forecasted prevailing visibility: 7000 m (7 km).
- f: Forecast significant weather SHRA: Moderate showers of rain.
- g: Cloud amount and cloud height (1st layer): 1 to 2 oktas and cloud base at 800 feet.
- h: Cloud amount and cloud height (2nd layer): 3 to 4 oktas of TCU with the cloud base at 1500 feet.
- i: Cloud amount and cloud height (3rd layer): 5 to 7 oktas and the cloud base at 2500 feet.
- j: Temporary fluctuations in forecast meteorological conditions TEMPO 1008/1010 3000 +SHRA: temporary, from 0800 UTC to 1000 UTC, reduced visibility 3000m (3 km) due to heavy showers of rain.
- k: Temporary fluctuations in forecast meteorological conditions PROB30 TEMPO 1010/1012 TSRA FEW008 BKN012CB BKN025: Moderate probability (30%), temporary, from 1000 UTC to 1200 UTC, moderate thunderstorm of rain, 1 to 2 oktas and cloud base at 800 feet, 5 to 7 oktas of CB at 1200 feet and 5 to 7 oktas, with the cloud base at 2500 feet.

EXAMPLE 2:

CANCELLATION OF THE PREVIOUS TAF

TAF	AMD	LEVS	100430Z	1003/1012	CNL=
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EXAMPLE 3:

TAF OF 24 HOURS LONG

TAF	LEST	191720Z	1918/2018	VRB02KT	6000	SCT050	TX18/2013Z	TN10/2004Z
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	
	BECMG 2003/2005 0900 FG BKN003 OVC008 TEMPO 2006/2009 0500 FG VV001 BECMG 2009/2011 04010KT 8000 NSW= <div style="display: flex; justify-content: space-between;"> <i>h</i> <i>i</i> <i>j</i> </div>							

- a: ICAO location indicator: LEST, Santiago.
- b: Day and time of the forecast 191720Z: Day 19th of the month at 1720 UTC.
- c: Period covered by the forecast 1918/2018: from 1800 UTC of 19th to 1800 UTC of 20th.
- d: Wind on surface: variable, 2 kt..
- e: Forecasted prevailing visibility: 6000 m (6 km).
- f: Cloud type and height of the clouds: 3 a 4 oktas and cloud base at 5000 feet.
- g: Forecasted maximum and minimum temperature TX18/2013Z TN10/2004Z: max temperature 18°C at 13Z and min temperature 10°C at 04Z of 20th.
- h: Change in forecast meteorological conditions BECMG 2003/2005 0900 FG BKN003 OVC040: changes from 0300 UTC and 0500 UTC: visibility 900 m due to presence of fog, very cloudy sky (5 to 7 oktas) with cloud base at 300 feet, covered sky (8 oktas) with cloud base at 800 feet.
- i: Temporary fluctuations in forecast meteorological conditions TEMPO 2006/2009 0500 FG VV001: temporary, from 0600 UTC to 0900 UTC, reduced visibility 500 m due to the presence of fog, and vertical visibility of 100 feet.
- j: Change in forecast meteorological conditions BECMG 2009/2011 04010KT 8000 NSW: changes from 0900 UTC to 1100 UTC, wind direction 40° and wind speed 10 kt, visibility 8000 m (8 km), and no significant weather .

SIGMET INFORMATION

SIGMET: "Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations."

FIRST LINE

ICAO location indicator of the ATS unit	Message identification and sequence number	Validity period (UTC)	Location indicator of MWO originating the message
LECM: for Madrid FIR/UIR LECB: for Barcelona FIR/UIR GCCC: for Canarias FIR/UIR	SIGMET n N: the number shall correspond with the number of SIGMET messages issued for the FIR/UIR since 0001 UTC on the day concerned.	Not more than 4 hours for normal SIGMET. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, the period of validity shall be extended up to 6 hours. Day Hour Min/Day Hour Min	LEVA-: MWO of Valencia. GCGC-: MWO of Las Palmas de Gran Canaria.

FOLLOWING LINES

Location indicator + name of the FIR for which the SIGMET is issued	Description of phenomenon causing the issuance of SIGMET	Observed and/or forecast phenomenon	Location and flight level or altitude	Movement (direction and speed)	Changes in intensity
LECM MADRID FIR/UIR or LECB BARCELONA FIR/UIR or GCCC CANARIAS FIR/UIR	OBSC² TS: obscured thunderstorms EMBD³ TS: embedded thunderstorms FRQ⁴ TS: frequent thunderstorms SQL⁵ TS: squall line thunderstorms OBSC TSGR⁶: obscured thunderstorms with hail EMBD³ TSGR: embedded thunderstorms with hail FRQ⁴ TSGR: frequent thunderstorms with hail SQL⁵ TSGR: squall line thunderstorms with hail TC (+name): tropical cyclone SEV TURB⁷: severe turbulence SEV ICE⁸: severe icing SEV ICE (FZRA⁹): severe icing due to freezing rain SEV MTW⁴: severe mountain wave HVY DS: heavy duststorm HVY SS: heavy sandstorm VA(+name of volcano): volcanic ash RDOACT CLD: radioactive cloud	1. OBS is used when the phenomenon is observed and expected to continue. Time of observation is included, if known. 2. FCST is used when the phenomenon is forecast. Time of forecast is included, if known	Location , referring to latitude and longitude (in degrees and minutes)) and flight level or altitude, ENTIRE FIR: if the phenomenon is forecast for the entire FIR	Direction with reference to one of the sixteen points of compass, Speed in kt or in km/h. Or stationary (STNR)	1. WKN: weakening 2. NC: no changes 3. INTSF: intensifying

SIGMET INFORMATION

NOTES

1. Only one of the described phenomena shall be included in a SIGMET message, using the abbreviations as indicated above.
2. OBSC if it is obscured by haze or smoke or cannot be readily seen due to darkness. If there are no obscured TS but obscured CB, the descriptor OBSC TS shall be used.
3. EMBD if it is embedded within cloud layers and cannot be readily recognized. If there are no embedded TS but embedded CB, the descriptor EMBD TS shall be used.
4. FRQ descriptor and severe mountain waves (MTW) are defined in the notes of AIRMET.
5. SQL should indicate a thunderstorm along a line with little or no space between individual clouds.
6. GR (hail) should be used as a further description of the thunderstorm, as necessary.
7. TURB (severe and moderate turbulence) should refer only to: low-level turbulence associated with strong surface winds; rotor streaming; or turbulence whether in cloud or not in cloud (clear air turbulence, CAT). Turbulence should not be used in connection with convective clouds
8. ICE (severe) should refer to icing in other than convective clouds
9. FZRA (freezing rain) should refer to severe icing conditions caused by freezing rain.
10. TS, CB and tropical cyclones imply severe turbulence and severe icing, so these phenomena are not explicitly included.
11. SIGMET CANCELLATION : CNL abbreviation is used. Example:
LECB SIGMET 3 VALID 101400/101600 LEVA-
LECB BARCELONA FIR/UIR CNL SIGMET 2 101200/101600.
12. For volcanic ash, tropical cyclones or any other phenomenon hazardous to aviation (i.e. turbulence) the forecast position of the phenomenon at the end of the validity period is included in the message.



EXAMPLES OF SIGMET MESSAGES

EXAMPLE 1: SIGMET FOR FREQUENT THUNDERSTORMS WITH HAIL

**LECM SIGMET 1 VALID 210500/210700 LEVA-
LECM MADRID FIR/UIR FRQ TSGR FCST N OF N4220 AND W OF W00630 TOP FL390 STRN WKN=**

Meaning:

First message SIGMET issued by the meteorological watch office LEVA for LECM FIR. The validity period is from 0500 UTC to 0700 UTC on the 21st of month. Frequent thunderstorms with hail are forecast at west of Galicia with cloud top at flight level 390. No significant movement is expected (stationary) and they will weaken

EXAMPLE 2: SIGMET FOR SEVERE TURBULENCE

**LECM SIGMET 2 VALID 210600/210900 LEVA-
LECM MADRID FIR/UIR SEV TURB OBS AT 0600Z N38 W008 FL240 MOV E 10KT WKN=**

Meaning:

Second message SIGMET issued by the meteorological watch office LEVA for LECM FIR. The message is valid from 0600 UTC to 0900 UTC on the 21st of month. Severe turbulence was observed at 0600 UTC at 38 degrees north and 8 degrees west, at flight level 240. The affected area of turbulence is expected to move to the east at 10 kt of speed and weakening

EXAMPLE 3: SIGMET CANCELLATION OF EXAMPLE 2

**LECM SIGMET 3 VALID 210730/210900 LEVA-
LECM MADRID FIR/UIR CNL SIGMET 2 VALID 210600/210900=**

EXAMPLE 4: SIGMET FOR TROPICAL CYCLONE (*fictitious location*)

**YUCC SIGMET 3 VALID 251600/252200 YUDO-
YUCC AMSWELL FIR TC GLORIA PSN N2706 W07306 CB OBS AT 1600Z WI 250NM OF TC CENTRE TOP FL500
MOV WNW 10KT NC FCST AT 2200Z TC CENTRE N2740 W07345=**

Meaning:

Third message SIGMET issued by the meteorological watch office YUDO for YUCC FIR. The message is valid from 1600 UTC to 2200 UTC on the 25th of month. The tropical cyclone Gloria, whose center is at 27°6'N 73°6'W with the top of cumulonimbus at flight level 500, was observed at 1600 UTC at a distance of 250 miles from its center. It is moving to the west-northwest at 10 kt. No changes in intensity are expected. It is forecast that at 22 UTC the position of its center will be at 27°40'N 73°45'W.

EXAMPLE 5: SIGMET FOR VOLCANIC ASH (*fictitious location*)

**YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315
E02115 – N4345 E02145 – N4330 E02215 – N4245 E02130 – N4230 E02145 – N4315 E02115 FL250/370 MOV ESE
20KT WKN FCST AT 1800Z NO VA EXP=**

Meaning:

Second message SIGMET issued by the meteorological watch office YUSO for YUDD FIR. The message is valid from 1200 UTC to 1800 UTC on the 10th of month. Eruption of volcano of ASHVAL mount located at 43°15'N 21°15'E. The ash cloud was observed at 1200 UTC inside the polygon circumscribed by the following points: 43°15'N 21°15'E, 43°45'N 21°45'E, 43°30'N 22°15'E, 42°45'N 21°30'E, 42°30'N 21°45'E y 43°15'N 21°15'E (initial point with which the polygon closes), between flight levels 250 and 370, moving to the east-southeast at 20 knots, and weakening. It is forecast that at 1800 UTC the ash cloud will scatter.

AREA FORECAST GAMET

GAMET: It is an area forecast in abbreviated plain language for low-level flights (FL150) for a flight information region or sub-area thereof. It is issued every 6 hour and it has a 6 hour validity period. When a weather phenomenon hazardous to low-level flights has been included in the GAMET area forecast and the phenomenon forecast does not occur, or is no longer forecast, a GAMET AMD shall be issued, amending only the weather element concerned, using the abbreviation NSW.

FIRST LINE

ICAO location indicator of the ATS unit	Message identification	Validity period (UTC)	Meteorological watch office originating the message
LECM: Areas 1 and 2 of Madrid FIR LECB: Barcelona FIR GCCC: Sub-area Islands of Canarias FIR	GAMET or GAMET AMD: an amended GAMET is issued if any of the forecast phenomena in SECI of GAMET does not occur or is no longer forecast.	YYGGgg/YYG _e G _e g _e g _e DayHourMin/DayHourMin The validity period is 6 hour	LEVA-: MWO of Valencia. GCGC-: MWO of Las Palmas de Gran Canaria

SECOND LINE

Location indicator and name of the FIR, or part thereof for which the GAMET is issued	Vertical limit of the responsibility area
LECM MADRID FIR/1 or LECM MADRID FIR/2 or LECB BARCELONA FIR or GCCC CANARIAS FIR SUBZONA ISLAS	BLW FL150: Below flight level 150

SECN I: Information on en-route weather phenomena hazardous to low-level flights (see note 1)

- (1) **SFC WIND:** [G₁G₁/G₂G₂] (See note 2) [Location] [Direction] [Speed (kt)]: Widespread surface wind > 30 kt (see note 6).
- (2) **SFC VIS:** [G₁G₁/G₂G₂] [Location] [Visibility in metres] [weather phenomena causing the reduction]: Widespread surface visibility < 5000 m (see note 6)
- (3) **SIGWX:** [G₁G₁/G₂G₂] [Location] [Significant weather condition]: Any of the following significant weather conditions included: ISOL TS, OCNL TS, ISOL TSGR, OCNL TSGR, FRQ TS, OBSC TS, EMBD TS, HVY SS, HVY DS, SQL TS, FRQ TSGR, OBSC TSGR, EMBD TSGR, SQL TSGR, VA
- (4) **MT OBSC:** [G₁G₁/G₂G₂] [Location]: Mountain obscuration.
- (5) **SIG CLD:** [G₁G₁/G₂G₂] [Location] [Amount (BKN or OVC)] [CB and/or TCU with ISOL, OCNL, FRQ or EMBD] [Altitude of cloud base and top (ft)]: Only clouds with height of base less than 1000 ft above ground level, and/or CB or TCU at any height, are included.
- (6) **ICE:** [G₁G₁/G₂G₂] [Location] MOD or SEV [Altitude of cloud base and top (FL)]: Moderate or severe icing.
- (7) **TURB:** [G₁G₁/G₂G₂] [Location] MOD or SEV [Altitude of cloud base and top (FL)]: Moderate or severe turbulence.
- (8) **MTW:** [G₁G₁/G₂G₂] [Location] MOD or SEV [Altitude of cloud base and top (FL)]: Moderate or severe mountain wave.
- (9) **SIGMET APLICABLES:** n.º of applicable message SIGMET to the FIR concerned or a sub-area thereof, for which the area forecast is valid.
When no elements are included in SECN I next message is included:
- (10) **HAZARDOUS WX NIL:** No weather phenomena hazardous to low level flights and no applicable SIGMET are forecast.

NOTES:

- 1: Elements of points 1 to 10 will only appear in GAMET when the phenomena is forecast during the validity period.
- 2: G₁G₁/G₂G₂. Optional group. Starting and end time of the weather phenomena forecast.
- 3: Vertical distances are altitudes, so they are referenced to the mean sea level (MSL) and the unity is the feet (ft). The AMSL abbreviation is used after FT. For some elements level flights (FL) are used.
- 4: For each element more than one line could be used. Only approved ICAO abbreviation are allowed.
- 5: These notes are complemented by AIRMET notes.
- 6: The term "areas extensas" (widespread surface) is used to indicate a spatial coverage of more than 75% of the affected area.

SECN II: Additional information required by low-level flights

- (11) **PSYS:** Data in abbreviated language on pressure centres and fronts and their expected movements and developments at the central hour of validity period of forecast.
- (12) **WIND/T:** Upper wind (in kt) and upper-air temperature (in °C) forecast for altitudes 02000, 05000, 10000, 15000 ft, for given locations at the central hour of validity period of forecast.
- (13) **CLD:** Cloud information not included in Section I on clouds amount (BKN or OVC) between 1000 ft of height and FL150, showing the cloud type if known: ST, SC, CU, AS, AC and NS.
- (14) **FZLVL:** Height indication of t = 0°C level(s) for given locations at the central hour of validity period of forecast.
- (15) **MNM QNH:** Forecast lowest QNH at the central hour of validity period of forecast (hectopascal).
- (16) **VA:** Volcanic eruptions and name of volcano.

AIRMET INFORMATION

AIRMET: Information concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of low-level aircraft operations (below FL150) and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub-area thereof (SECN I of GAMET)

FIRST LINE

ICAO location indicator of the ATS unit	Message identification and sequence number	Validity period (UTC)	Location indicator of the meteorological watch office originating the message
LECM: Areas 1 and 2 of Madrid FIR LECB: Barcelona FIR GCCC: Sub-area Islands of Canarias FIR	AIRMET n n: the number shall correspond with the number of AIRMET messages issued for the FIR, or sub-area of FIR, since 0001 UTC on the day concerned	The period of validity shall be not more than 4 hours. Format: DayHourMin/DayHourMin	LEVA: MWO of Valencia. GCGC: MWO of Las Palmas de Gran Canaria

FOLLOWING LINES

Location indicator + name of the FIR, or part thereof for which the AIRMET is issued	Description of phenomenon causing the issuance of AIRMET	Observed or forecast phenomenon	Location and flight level or altitude	Movement (direction and speed)	Changes in intensity
LECM MADRID FIR/1 or LECM MADRID FIR/2 or LECB BARCELONA FIR or GCCC CANARIAS FIR SUBZONA ISLAS	<p>* Widespread areas where mean surface wind speed > 30 kt (60 km/h): SFC WIND (+ wind speed, direction and units)</p> <p>* Widespread areas affected by reduction of visibility to less than 5000 m: SFC VIS (+ visibility in m + weather phenomena)</p> <p>* Thunderstorms: ISOL TS, OCNL TS (without hail) ISOL TSGR, OCNL TSGR (with hail)</p> <p>* Mountains obscured: MT OBSC</p> <p>* Widespread areas of BKN or OVC cloud with height of base less than 1000 ft above ground level: BKN CLD or OVC CLD (+ height of the base and top + units)</p> <p>* Cumulonimbus: ISOL CB, OCNL CB, FRQ CB</p> <p>* Towering cumulus clouds: ISOL TCU, OCNL TCU, FRQ TCU</p> <p>* Moderate icing: MOD ICE</p> <p>* Moderate turbulence: MOD TURB</p> <p>* Moderate mountain wave: MOD MTW</p>	<p>1. OBS is used when the phenomenon is observed and expected to continue. Time of observation is included, if known.</p> <p>2. FCST is used when the phenomenon is forecast. Time of forecast is included, if known</p>	Location , referring to latitude and longitude (in degrees and minutes) and flight level or altitude	Direction with reference to one of the sixteen points of compass Speed in kt or in km/h Or stationary (STNR)	<p>1. WKN: weakening</p> <p>2. NC: no changes</p> <p>3. INTSF: intensifying</p>

AIRMET INFORMATION

NOTES

1. The term widespread areas is used to indicate a spatial coverage greater than 75 per cent of the area affected by the phenomenon.
2. ISOL (isolated): TS, CB or TCU which affect, or are forecast to affect, an area with a maximum spatial coverage less than 50 per cent of the area concerned (at a fixed time or during the period of validity).
3. OCNL (occasional): well-separated TS, CB or TCU which affect, or are forecast to affect, an area with a maximum spatial coverage between 50 and 75 per cent of the area concerned (at a fixed time or during the period of validity)
4. FRQ (frequent): an area of TS, CB or TCU if there is little or no separation between adjacent TS, CB or TCU with a maximum spatial coverage greater than 75 per cent of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).
5. Descriptors OBSC and TURB are defined in the notes of SIGMET.
6. A mountain waves should be considered:
 - a) severe: whenever an accompanying downdraft ≥ 3.0 m/s (600 ft/min) and/or severe turbulence is observed or forecast.
 - b) moderate: whenever an accompanying downdraft of 1.75–3.0 m/s (350–600 ft/min) and/or moderate turbulence is observed or forecast.
7. AIRMET information on icing and turbulence associated with TS, CB or TCU should not be included, as TS, CB and TCU imply these phenomena. However, hail will be included in AIRMET on TS.
8. CANCELLATION of AIRMET: The abbreviation CNL will be used.
9. These notes are complemented with the notes of GAMET.

EXAMPLES OF GAMET, GAMET AMD, AIRMET AND CNL AIRMET

EXAMPLE 1: Routine GAMET (from 0300 to 0900 UTC)

**FASP40 LEMM 272300
LECM GAMET VALID 280300/280900 LEVA-
LECM MADRID FIR/1 BLW FL150**

SECN I

**SIGWX: N OF N41 OCNL TSGR
SIG CLD: 02500/ABV15000FT AMSL N OF N41 OCNL CB
ICE: 03/06 050/100FL AMSL N OF N4030 MOD
MTW: S OF N41 MOD
SIGMET APLICABLES: 1**

SECN II

PSYS: 06 L 1004 HPA N38 E003 MOV E 05KT INTSF

WIND/T:	LA CORUÑA	MADRID	SANTANDER	ZARAGOZA
	N4330 W00838	N4049 W00359	N4342 W00382	N4166 W00101
02000FT	029/17KT PS03	351/13KT PS04	345/18KT PS02	321/14KT PS03
05000FT	024/20KT MS04	358/17KT MS03	328/21KT MS05	339/21KT MS05
10000FT	011/32KT MS12	349/23KT MS14	018/23KT MS16	338/14KT MS15
15000FT	224/55KT MS20	312/42KT MS23	234/20KT MS28	305/20KT MS27

CLD: ALL FIR BKN SC 02500/13000FT AMSL

FZLVL: 03400FT AMSL 03900FT AMSL 02700FT AMSL 03100FT AMSL

MNM QNH: 1010 HPA=

EXAMPLES OF GAMET, GAMET AMD, AIRMET AND CNL AIRMET

Meaning:

Area forecast for low-level flights (GAMET) for sub-area 1 of flight information region (FIR) of Madrid and location indicator of the area control centre LECM . It includes altitudes for below flight level 150 (FL150). The message is issued by the meteorological watch office of Valencia (LEVA). The message is valid from 0300 UTC to 0900 UTC on the 28th of the month.

Section I:

Significant weather phenomena (SIGWX): during the validity period occasional thunderstorms with hail at north of parallel 41° N.

Significant clouds (SIG CLD): during the validity period occasional cumulonimbus base 2500, top higher than 15000 feet at north of 41 degrees north, so these CB are related to the thunderstorms of the previous element SIGWX.

Icing (ICE): moderate between 0300 UTC and 0600 UTC between flight level 050 and 100, at north of 40 degrees and 30 minutes north.

Mountain waves (MTW): during the validity period moderate mountain waves at south of 41 degrees north.

SIGMET message n.º 1 applicable to the validity period and sub-area concerned of Madrid FIR.

Section II:

Pressure systems and fronts (PSYS): at 0600 UTC (central hour of forecast), low pressure of 1004 hectopascals at 38° degrees north 3 degrees west, expected to move eastwards at 5 knots and to strengthen in intensity.

Winds (direction degrees and speed knots) and temperatures (degrees Celsius): at 2000, 5000, 10000 and 15000 feet, in A Coruña, Madrid, Santander and Zaragoza (at the central hour of the forecast: 0600 UTC).

PS: positive temperature; MS: negative temperature. Example: in A Coruña, at 2000 ft, wind direction 29 degrees, wind speed 17 kt, temperature 3°C. At 5000 ft, wind direction 24 degrees, wind speed 20 kt, temperature -4°C.

Clouds (CLD): during the validity period broken stratocumulus, base 2500 ft, top 13000 ft altitude.

Freezing level (FZLVL): at 0600 UTC (central hour of the forecast), in A Coruña at 3400 ft, in Madrid at 3900 ft, in Santander at 2700 ft and in Zaragoza at 3100 ft altitude.

Minimum QNH: at 0600 UTC (central hour of the forecast), 1010 hectopascals.

EXAMPLE 2: GAMET AMD (amendment to the previous GAMET)

At 0430 UTC it is observed that forecast CB and associated thunderstorms are no longer present. Therefore an amended GAMET is issued.

```
FASP40 LEMM 272300 AAA
LECM GAMET AMD1 VALID 280430/280900
LECM MADRID FIR/1 BLW FL150
SECN I
SIGWX: NSW
SIG CLD: NSW
..... From here amended GAMET is similar to example 1.
```

Meaning:

Amendment number 1 to GAMET with validity period 280300/280900 UTC referred to a Madrid FIR area 1, valid from 0430 to 0900 UTC of day 28th. Message issued by the meteorological watch office of Valencia (LEVA), and destined to flights below flight level 150.

Section I:

Significant weather phenomena are no longer present since 0430 UTC.

The rest of the message is the same as the one in example 1.

EXAMPLES OF GAMET, GAMET AMD, AIRMET AND CNL AIRMET

EXAMPLE 3: AIRMET FOR REDUCTION OF VISIBILITY

At 04:55 UTC a reduction of visibility is observed less than 5000 m and it was not included in the current GAMET. For this reason, an AIRMET is issued including this phenomenon, which is hazardous for low level flights.

```
LECM AIRMET 1 VALID 280500/280900 LEVA-  
LECM MADRID FIR/1 SFC VIS 3000M RA OBS AT 0455Z N OF N4310 AND E OF W00720 STRN NC=
```

Meaning:

First message AIRMET from 0001 UTC issued by the meteorological watch office LEVA for area 1 of Madrid FIR. The message is valid from 0500 UTC to 0900 UTC on 28th of the month. At 0455 UTC a reduction of visibility of 3000 m was observed, due to rain at north of 43°10' N and east of 7°20' W. Stationary visibility and no changes in intensity are forecast.

EXAMPLE 4: CNL AIRMET (cancellation of the previous AIRMET)

At 0600 UTC the visibility is greater than 5000 m. So, in that moment the AIRMET is cancelled.

```
LECM AIRMET 2 VALID 280600/280900 LEVA-  
LECM MADRID FIR/1 CNL AIRMET 1 280500/280900=
```



SPECIAL AIREP

Special **AIREP** are special air-reports made by an aircraft in flight about adverse weather phenomena. These reports are issued to the appropriate air traffic services unit, and this unit issues the reports to the corresponding meteorological watch office (OVM). The OVM will encode the message and send it to the communication network so that it is available to aeronautical users.

The adverse weather phenome that should be included into the AIREP are the following:

Weather phenomenon	
SEV TURB	Severe turbulence
SEV ICE	Severe icing
MOD TURB	Moderate turbulence
MOD ICE	Moderate icing
SEV MTW	Severe mountain wave
TS	Thunderstorm without hail
TSGR	Thunderstorm with hail
HVY SS	Heavy duststorm or heavy sandstorm
VA [MT nnnnnnnn]	Pre-eruption volcanic activity or volcanic eruption. Name and position of volcano, if known
VA CLD	Volcanic ash cloud

The format of the report is the following:

AIREP	
Message type designator	ARS (it means Special AIREP)
Aircraft identification	Given by the pilot
Weather phenomenon	As given in the previous table
Time of observation	OBS AT nnnnZ (nnnn: hours and minutes UTC)
Position	In latitude and longitude: degrees and minutes (NnnnnWnnnnn or NnnnnEnnnnn or SnnnnWnnnnn or SnnnnEnnnnn)
Flight level or altitude	FLnnn or FLnnn/nnn or nnnnM or [n]nnnnFT



SPECIAL AIREP

EXAMPLE 1: TURBULENCE

UASP60 LEMM 112006 ARS RAM725A MOD TURB OBS AT 1735Z N3710W00359 FL390=

Message heading: UASP60 LEMM 112006

AIREP (UA) for the Iberian Peninsula and the Balearic Islands (SP) of any of the phenomena given in the table of AIREP (60), excepting ash cloud, issued by AEMET (LEMM) day 11th of the month at 20:06 Z (112006)

ARS: Special AIREP

RAM725A: Aircraft identification

MOD TURB: Moderate turbulence

OBS AT 1735Z: observed at 17:35 Z

N3710W00359: observed in latitude 37° 10' N and longitude 03° 59' W

FL390: flight level 390

EXAMPLE 2: ASH CLOUD

UACR70 LEMM 081540 ARS VA812 VA CLD OBS AT 1530Z N2373 W01803 FL 300=

Message heading: UACR70 LEMM 081540

AIREP (UA) for the Canary Islands (CR) of ash cloud (70), issued by AEMET (LEMM) day 8th at 15:40 Z (081540)

ARS: Special AIREP

VA812: Aircraft identification

VA CLD: Volcanic ash cloud

OBS AT 1530Z: observed at 15:30 Z

N2373W01803: observed in latitude 23° 73' N, and longitude 018° 3' W

FL300: flight level 300



CHART OF LOW-LEVEL SIGNIFICANT WEATHER FORECAST (SIGWX SFC/150)

Table 5: ABBREVIATIONS USED FOR DESCRIBING CLOUDS

Clouds (excepting CB and TCU)	Descriptors for CB and TCU
BKN = Broken sky (5 a 7 oktas) OVC = Overcast sky (8 oktas) LZR = Layer	ISOL = Isolated OCNL = Occasional FRQ = Frequent EMBD = Embedded in a layer

NOTES (clouds)

- Base and top altitude in hundreds of feet.
- Top altitude above FL150 is indicated by the abbreviation XXX.
- Symbol SFC is used if the forecast altitude of the cloud base is at ground level. In áreas where the forecast
- In areas where the presence of at least two layers of stratiform clouds with BKN or OVC coverage is forecast, whose respective distances from the top to the base do not exceed 3000 feet, LZR is used, followed by the altitude of the highest top and the lowest base.
- Inclusion of thunderstorm or CB implies the presence of associated turbulence or icing (severe or moderate).

EXAMPLES OF CLOUDS

BKN CU $\frac{040}{020}$ *ISOL CB* $\frac{XXX}{015}$ *OVC LZR* $\frac{100}{SFC}$

Table 6: OTHER SYMBOLS USED IN THE CHART OF LOW-LEVEL SIGNIFICANT WEATHER

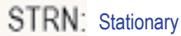
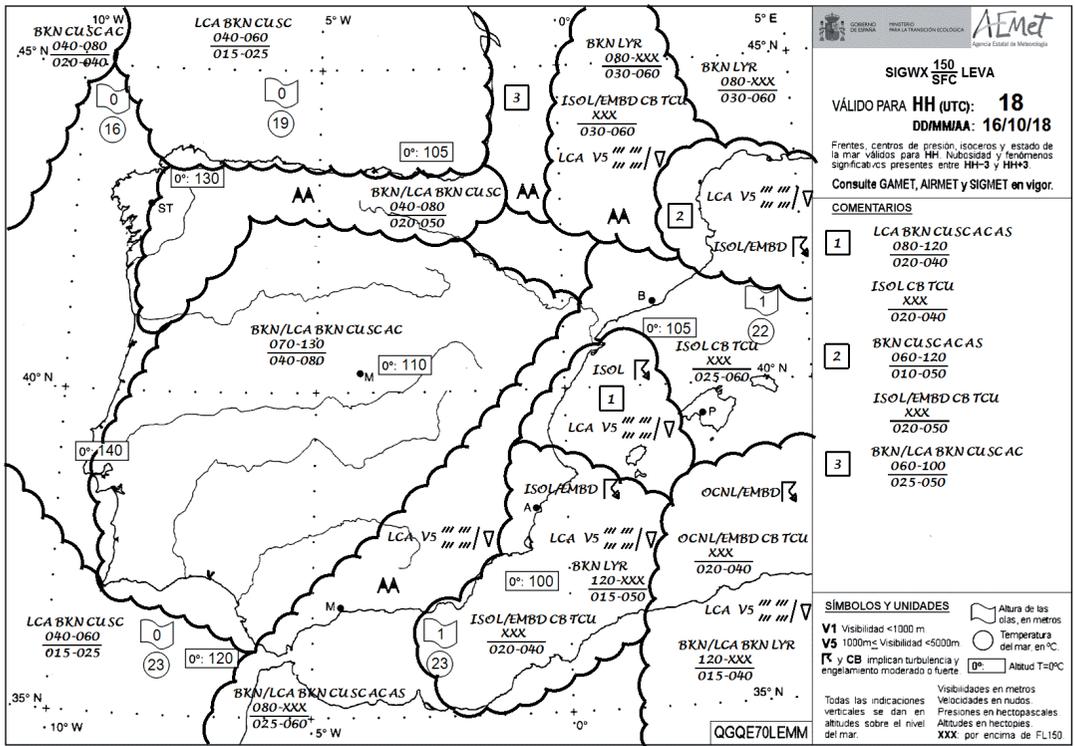
 Convergence line	 Area of turbulence	 Cold front at the surface
 Freezing level, in hundreds of feet	 Warm front at the surface	 Occluded front at the surface
 State of the sea	 Sea-surface temperature	 Quasi-stationary front at the surface
 Widespread strong surface wind > 30 kt	 Direction and speed of the displacement (kt)	 STRN: Stationary
L: Low pressure centre	H: High pressure centre	SLW: Slow displacement (<10 kt)

CHART OF LOW-LEVEL SIGNIFICANT WEATHER (SIGWX SFC/150)

EXAMPLE OF CHART OF LOW-LEVEL SIGNIFICANT WEATHER



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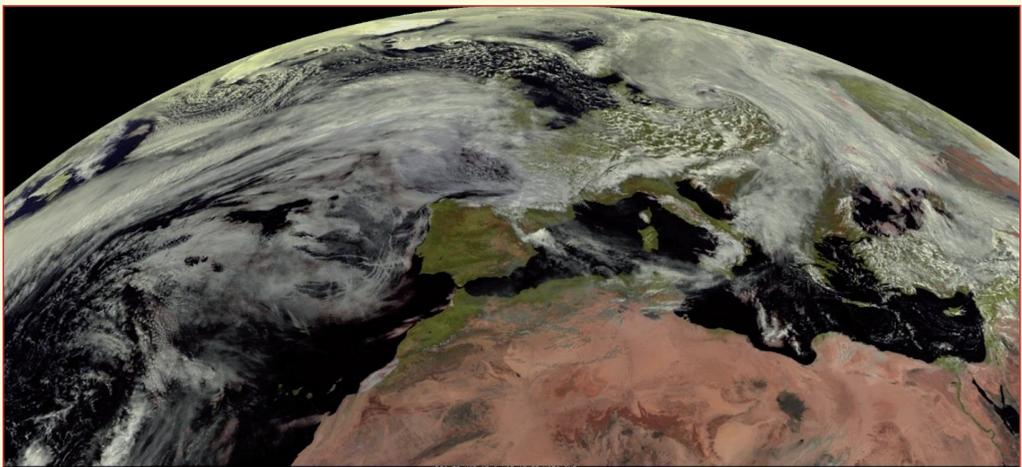
QGGE70LEMM0600

20181016

This chart contains the forecast weather phenomena for the low levels SFC/FL150 of the Iberian Peninsula and the Balearic Islands at 18 Z and date 16/10/2018. It has been elaborated by the meteorological watch office of Valencia.

Scalloped line: delimits areas of homogeneous cloudiness and/or significant weather.

It is shown in the chart widespread areas of local visibility below 5000 m (LCA V5) caused by rain or rain showers, BKN cloud layers, TCU and CB clouds, thunderstorms or mountains obscured.



AERODROME WARNINGS

Aerodrome warnings shall give concise information of meteorological conditions which could adversely affect aircraft on the ground, including parked aircraft, and the aerodrome facilities and services.

- An aerodrome warning shall be issued when any of the phenomena listed in table 7 are observed or forecast. In the case of wind and precipitation an aerodrome warning is issued in accordance with some quantitative criteria: the expected wind gust and the expected total rain (see table 8).
- When the phenomenon is forecast the aerodrome warning shall be issued not more than 24 hours before the commencement of the period of validity.

Tabla 7: WEATHER PHENOMENA

Phenomenon (1)	Template (2)
Mean wind speed with maximum wind gust	SFC WSPD nn[n]KT MAX nn[n]
Mean surface wind (direction and speed) and maximum wind gust	SFC WIND nnn/nn[n]KT MAX nn[n]
Accumulated precipitation in 1 or 12 hours	RAINFALL IN 1HR MORE THAN nnMM RAINFALL IN 12HR MORE THAN nn[n]MM
Thunderstorm	[HVY] TS
Squall (3)	SQ
Hail	GR
Frost (4)	FROST T MSnnC
Snow (5) (including the expected or observed snow accumulation)	[PROB30, PROB40, PROB70][HVY] SN nnCM
Freezing precipitation	[HVY] FZRA o [HVY] FZDZ
Hoar frost or white rime	RIME
Sandstorm	[HVY] SS
Duststorm	[HVY] DS
Swirling sand or dust	SA (sand), DU (dust)
Volcanic ash [volcanic ash deposition]	VA [DEPO]
Tsunami	TSUNAMI
Toxic chemicals substances	TOX CHEM

1. In every warning only one phenomenon is included.
2. Brackets [] indicate that information inside brackets is included if needed.
3. Squall (SQ): Strong wind that arises suddenly and usually lasts at least one minute. It differs from wind gusts in its duration. The sudden increase in wind speed is 16 kt (32km/h), and the speed increases to 22 kt or more and lasts at least one minute. Squalls are often associated with large cumulonimbus clouds and a violent convective activity, extending several kilometers horizontally and several thousand feet vertically.
4. FROST shall always be used with temperature information in degrees Celsius. Negative temperature after FROST shall be preceded by abbreviation MS. T is the ICAO abbreviation for temperature and C for degrees Celsius. Only forecast warnings are given for frost.
5. For snow (SN) the thickness of the deposit in cm should be always included. In case it does not expect snow to accumulate on the ground, it will be indicated with 00CM. Probability will only be used for those aerodromes which have agreements on the forecast of snow. The probability refers to occurrence of the phenomenon and not to the thickness of the deposit.

AERODROME WARNINGS

FORMAT AND CONTENTS OF AERODROME WARNINGS

Message heading

The heading of the message consists of a line that includes the following:

WWSP60 or WWCR60 CCCC DDHMM		
(a)	(b)	(c)

- (a) Aerodrome warning identification. CR for the Canary Islands and SP for the rest of aerodromes
- (b) Location indicator of the aerodrome originating the warnings
- (c) Day, hour and minutes UTC of message issue

Message content

The message consists of a line that includes the following:

CCCC	AD	WRNG n[n]	VALID nnnnnn/nnnnn	(met phenomenon)	(observed and/or forecast)	(intensity)
(a)	(b)	(c)	(c)	(d)	(e)	(f)

- (a) Location indicator of the aerodrome originating the warning. The same as the warning heading
- (b) Message identification: AD WRNG n[n]
 - AD WRNG: Type of message.
 - n: sequence number starting at 0001 UTC of the day the warning is issued. Numbering is different for every aerodrome. Only one digit is included for numbers less than 10.
- (c) Period of validity: VALID nnnnnn/nnnnn
 - Start and end of the validity period using 6 digits (two for the day, two for the hour and two for the minutes, in UTC), for each group separated by «/». Example: VALID 220900/220913.
 - The validity period may be extended up to a maximum of 24 hours.
- (d) Meteorological phenomenon
 - Each warning includes only one phenomenon from the table 6.
- (e) Observed or forecast phenomenon
 - The following ICAO abbreviations are used:
 - OBS [AT nnnnZ]: Indicates that the phenomenon was observed [at nnnnZ].
 - FCST: Indicates that the phenomenon is forecast.
 - Brackets [] after OBS indicate that when time of observation is known it will be included using the format inside the brackets. Example: OBS AT 1045Z.
- (f) Intensity changes
 - When the forecast of intensity changes is known the following abbreviations are used:
 - INTSF: Intensifying
 - WKN: weakening
 - NC: No changes

CANCELLATION

Aerodrome warning is cancelled when the conditions that originated it no longer hold

UPDATE

An update of a warning is accomplished by cancelling it and issuing a new one, as long as it is the same phenomenon and its period of validity has not yet expired

AERODROME WARNINGS

Table 8. THRESHOLD VALUES FOR AERODROME WARNINGS

Aerodrome	Wind (kt) Max gust	Rainfall in 1 hour (mm)	Rainfall in 12 hours (mm)	Aerodrome	Wind (kt) Max gust	Rainfall in 1 hour (mm)	Rainfall in 12 hours (mm)
A Coruña	43	30	60	Lleida	43	30	60
Albacete	40	30	60	Logroño	43	30	60
Algeciras	43	30	60	Madrid / Adolfo Suárez -Barajas	30	30	60
Alicante	43	30	100	Madrid / Cuatro Vientos	30	30	60
Almería	43	30	80	Málaga	40	15	40
Andorra-La Seu	30	30	60	Mallorca/ Son Bonet	30	15	60
Asturias	43	30	60	Melilla	43	30	80
Badajoz	43	30	60	Menorca	30	15	60
Barcelona	43	30	80	Murcia / Región de Murcia	43	30	60
Bilbao	43	30	60	Palma de Mallorca	25 (2°,4°) 30 (1°,3°)	15	60
Burgos	43	15	30	Pamplona	43	30	40
Castellón	43	30	60	Reus	43	30	80
Córdoba	43	30	80	Sabadell	30	30	80
El Hierro	42	30	60	Salamanca	43	15	30
Fuerteventura	49 (1° Cuad) 40 (2°,3°,4°)	30	60	San Sebastián	35 (1°,2°) 45 (3°,4°)	30	60
Girona	43	30	80	Santander	43	30	60
Gran Canaria	49 (1° Cuad) 40 (2°,3°,4°)	30	60	Santiago	43	30	60
Granada	43	30	80	Sevilla	43	30	80
Huesca	43	30	40	Tenerife Norte	43	30	60
Ibiza	30	15	60	Tenerife Sur	40	30	60
Jerez	43	30	80	Valencia	43	30	60
La Gomera	49 (1°,4°) 40 (2°,3°)	30	60	Valladolid	43	15	30
La Palma	40 (1°,2°) 15 (3°,4°)	30	60	Vigo	43	30	60
Lanzarote	49 (1° Cuad) 40 (2°,3°,4°)	30	60	Vitoria	35	30	60
León	43	15	30	Zaragoza	43	30	40

AERODROME WARNINGS

EXAMPLES OF AERODROME WARNINGS

WWSP60 LEST 100600

LEST AD WRNG 5 VALID 101200/101800 RAINFALL IN 1HR MORE THAN 45MM FCST NC=

Warning n° 5 for the airport of Santiago, valid between 1200Z and 1800Z: total rainfall in 1 hour more than 45 mm. No changes in intensity are forecast.

WWSP60 LEZG 122100

LEZG AD WRNG 1 VALID 130600/130800 FROST T MS02C FCST NC=

Warning n° 1 for the airport of Zaragoza, valid between 0600Z and 0800Z: frost with forecast temperature -2°C. No changes in intensity are forecast.

WWCR60 GCLA 071200

GCLA AD WRNG 2 VALID 071200/071600 SFC WSPD 30KT MAX 40 OBS AT 1155Z INTSF=

Warning n° 2 for the airport of La Palma, valid between 1200Z and 1600Z: wind gusts of 40 knots observed at 1155Z and intensifying.

WWCR60 GCLA 071400

GCLA AD WRNG 3 VALID 071400/071600 CNL AD WRNG 2 071200/071600=

At 1400Z strong wind that caused the warning n° 2 is no longer observed or forecast, and it is cancelled.



WARNINGS OF LIGHTNING OBSERVED WITHIN THE AERODROME

The warnings of lightning observed within or close to the aerodrome are generated automatically with data from the AEMET network of electrical discharge detectors, using a software application. They are shown in text format and serve as support to the refueling operations of the aircraft.

Using the position (latitude-longitude) of each aerodrome and the detected lightning, the software program searches every 2 minutes for the detected lightning within a circle of 25 km of radius centered at the airport. Depending on the proximity to the airport, three different areas are defined:

- Maximum alert : circle of 5 km of radius
- Alert: circle of 8 km of radius
- Prior alert: circle of 25 km of radius

Depending on the location of the lightning, four types of warning are generated: prior alert (25 km), alert (8 km), maximum alert (5 km) and normal situation (after 10 minutes without any lightning within those areas).



EXAMPLES OF LIGHTNING DETECTED

WWSP61 LEMD 220252

AGENCIA ESTATAL DE METEOROLOGIA

AVISO DE RAYOS EN EL AREA DEL AEROPUERTO DE MADRID/BARAJAS

22 DE MARZO DE 2015. 02:52 UTC. COMIENZO DEL ESTADO DE PREALERTA (CIRCULO DE 25 KM DE RADIO)

WWSP61 LESO 162134

AGENCIA ESTATAL DE METEOROLOGIA

AVISO DE RAYOS EN EL AREA DEL AEROPUERTO DE SAN SEBASTIAN

16 DE ENERO DE 2015. 21:34 UTC. COMIENZO DEL ESTADO DE ALERTA (CIRCULO DE 8 KM DE RADIO)

WWCR61 GCLA 301634

AGENCIA ESTATAL DE METEOROLOGIA

AVISO DE RAYOS EN EL AREA DEL AEROPUERTO DE LA PALMA

30 DE DICIEMBRE DE 2014. 16:34 UTC. COMIENZO DEL ESTADO DE ALERTA MAXIMA (CIRCULO DE 5 KM DE RADIO)

WWSP61 LEZL 131044

AGENCIA ESTATAL DE METEOROLOGIA

AVISO DE RAYOS EN EL AREA DEL AEROPUERTO DE SEVILLA

13 DE DICIEMBRE DE 2014. 10:44 UTC. COMIENZO DE LA SITUACION NORMAL

WARNINGS OF FORECASTING THUNDERSTORMS WITHIN THE AERODROME

The way to obtain the thunderstorm warnings is to perform a linear extrapolation of the stormy cores that can affect each airport in the next 20 minutes, generating then a forecasting storm warning. The extrapolation is performed by a computer application that runs every 10 minutes for all airports and makes use of the detected lightning (within a radius of 25 km around the airport), the radar data and the fields of numerical prediction models.

FORMAT AND CONTENT OF THE WARNINGS

Heading:

WWSP62 (or WWCR62) CCCC DDHMM

- WWSP62 (or WWCR62): WW (warning identification), SP or CR (area identification), 62: number of message.
- CCCC: ICAO location indicator of the aerodrome originating the message.
- DDHMM: Day, hour and minutes UTC of message issue.

Text:

AGENCIA ESTATAL DE METEOROLOGÍA

WWSP62 ACT CCCC AAMDDHH:MM VAL 20m AAAAAA MOV nn/nn

TORMENTA PREVISTA para el área del aeropuerto de NOMBRE AEROPUERTO

MENSAJE emitido a las HH:MM UTC del DD de Mes de Año.

Se detecta tormenta que posiblemente afectará a la zona del aeropuerto en los próximos 20 minutos, situada al nn, desplazándose hacia el nn.

Meaning:

- ACT: abbreviation to indicate activity.
- CCCC: ICAO location indicator of the aerodrome for which the warning is issued.
- AAMDDHH:MM: year (AA), month (MM), day (DD), hour (HH) and minute (MM) UTC when the warning is generated.
- VAL: abbreviation to indicate the validity period.
- 20m: validity of the message, 20 minutes.
- AAAAAA: it could take the following values:
 - o UNA: for a single thunderstorm.
 - o VARIAS: for several thunderstorms.
- MOV: movement of the thunderstorm (only for a single thunderstorm).
- nn/nn: Direction of the displacement of the thunderstorm with respect to one of the 8 points of the compass (N, NE, E, SE, S, SW, W, NW). First two letters before the slash indicate the current position, and two letters after the slash indicate the displacement.

Example:

WWSP62 LEBL 141804

AGENCIA ESTATAL DE METEOROLOGIA

WWSP62 ACT LEBL 15031418:00 VAL 20M UNA MOV NW/ N

TORMENTA PREVISTA PARA EL AREA DEL AEROPUERTO DE BARCELONA

MENSAJE EMITIDO A LAS 18:00 UTC DEL 14 DE MARZO DE 2015

SE DETECTA TORMENTA QUE POSIBLEMENTE AFECTARA A LA ZONA DEL AEROPUERTO EN LOS PROXIMOS 20 MINUTOS, SITUADA AL NW, DESPLAZANDOSE HACIA EL N DEL AEROPUERTO

METEOROLOGICAL INFORMATION AVAILABLE AT OMA

REAL TIME INFORMATION OF THE AIRPORT

Direction and wind speed: instant wind, mean speed of the wind over 2-minutes and 10-minutes period, maximum and minimum wind speed. Temperature and dew-point temperature. Humidity. QNH and QFE. At most airports components of the wind on runways, clouds height and RVR are also shown.

ALPHANUMERIC INFORMATION AVAILABLE AT OMA

METAR (SA).

SPECI (SP).

TAF (FC y FT) and amendments.

SIGMET (WS).

SIGMET for volcanic ash (WV).

SIGMET for tropical cyclone (WC).

Volcanic ash advisory information (FV).

Tropical cyclone advisory information (FK).

Special AIREP (UA).

GAMET for the Iberian Peninsula and the Balearic Islands (FASP) and for the Canary Islands (FACR).

AIRMET for the Iberian Peninsula and the Balearic Islands (WASP) and for the Canary Islands (WACR).

Forecasts for take-off (by request, with agreement).

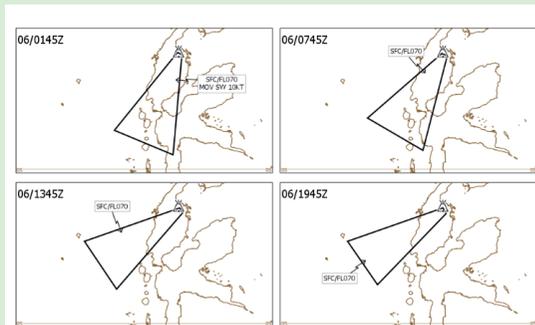
Forecast for temperature (below 0°C).

Aerodrome warnings, observed and forecast.

Warnings of observed lightning and forecasting thunderstorms

Wind shear warnings (if available).

Radiosoundings in Madrid/Barajas, A Coruña, Santander, Huelva, Palma, Tenerife y Murcia.



VOLCANIC ASH ADVISORY			
DTG	DETERMINED	ADVISORY INFO	STATUS
LANG	CATEGORY	DESCRIPTION	REFERENCE
06/0145Z	WV	05	060822/061345 WAAA- WAAZ UJUNG FIR PANDANG FIR VA
06/0745Z	WV	05	060822/061345 WAAA- WAAZ UJUNG FIR PANDANG FIR VA
06/1345Z	WV	05	060822/061345 WAAA- WAAZ UJUNG FIR PANDANG FIR VA
06/1945Z	WV	05	060822/061345 WAAA- WAAZ UJUNG FIR PANDANG FIR VA

VOLCANIC ASH ADVISORY INFORMATION (above) and SIGMET FOR VOLCANIC ASH : WAAZ SIGMET 05 VALID 060822/061345 WAAA- WAAZ UJUNG FIR PANDANG FIR VA ERUPTION MT DUKONO PSN N0141 E12753 VA CLD EST AT 0745Z WI N0144 E12751 - N0023 E12716 - N0018 E12757 - N 0144 E12756 - N0144 E12751 SFC/FL070 FCST AT 1345Z WI N0144 E12752 - N0140 E12757 - N0023 E12717 - N0048 E 12645 - N0144 E12752

IMAGES TAKEN BY THE METEOROLOGICAL RADAR



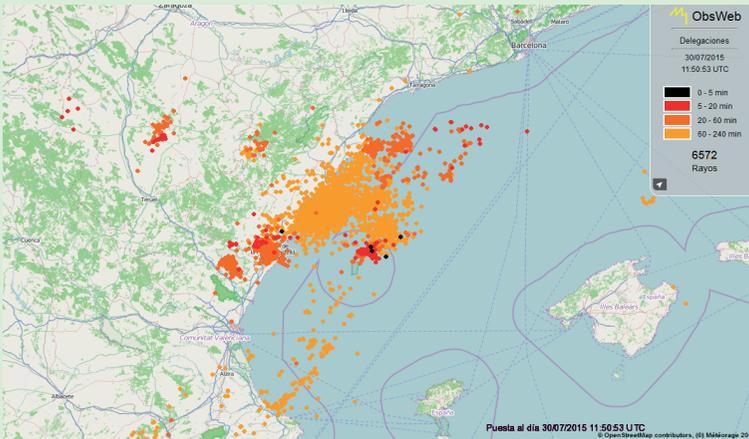
AEMET has a network of 15 C-band Doppler radars, 13 over the Peninsula, one in the Balearic Islands and one in the Canary Islands. Each of these radars covers an area of 240 kilometers radius (excepting the Canary Islands, with a radius of 300 kilometers) and generates a volume of data every 10 minutes. From these data, different types of products are obtained, among others: PPI of reflectivity, maximum reflectivity, Echo Top, radial wind speed, estimation of surface precipitation intensity, liquid water content in the column, cumulative rainfall in one hour and cumulative rainfall corrected with data from rain gauge

In addition, products of national coverage are also included, covering the entire territory excepting the Canary Islands and, in some cases, including Portuguese radars.

The radar information is shown on the IRIS-display work stations at OMPA, so that the particular area of interest for every OMPA and the national coverage are shown at the same time.

DETECTED LIGHTNING IMAGES

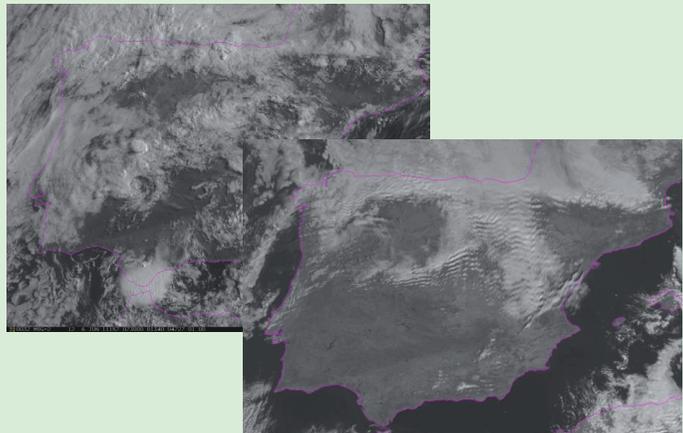
The AEMET lightning detection network is made up of three subsystems for the detection of lightning: the control of equipment, the analysis and location of their measurements and the exploitation of these data. There are twenty detection devices of lightning spread throughout the peninsular territory and the Balearic and the Canary islands. These devices capture, analyze and discriminate the electromagnetic radiation generated in the atmospheric electric discharges detected within its range.



Data are exchanged with other countries, such as France and Portugal. For every airport and military air base, warnings of detected lightning are obtained for three different circles centered at the airport within a radius of 5 km, 8 km and 25 km. A software application shows these discharges at the OMA.

SATELLITE IMAGES

AEMET provides at its offices Meteosat satellite images of the latest generation (MSG), as well as cloud type images. Satellite images are provided every 15 minutes on 11 different channels in the visible, infrared and water vapor bands (3 km) plus a high resolution visible channel (1 km).



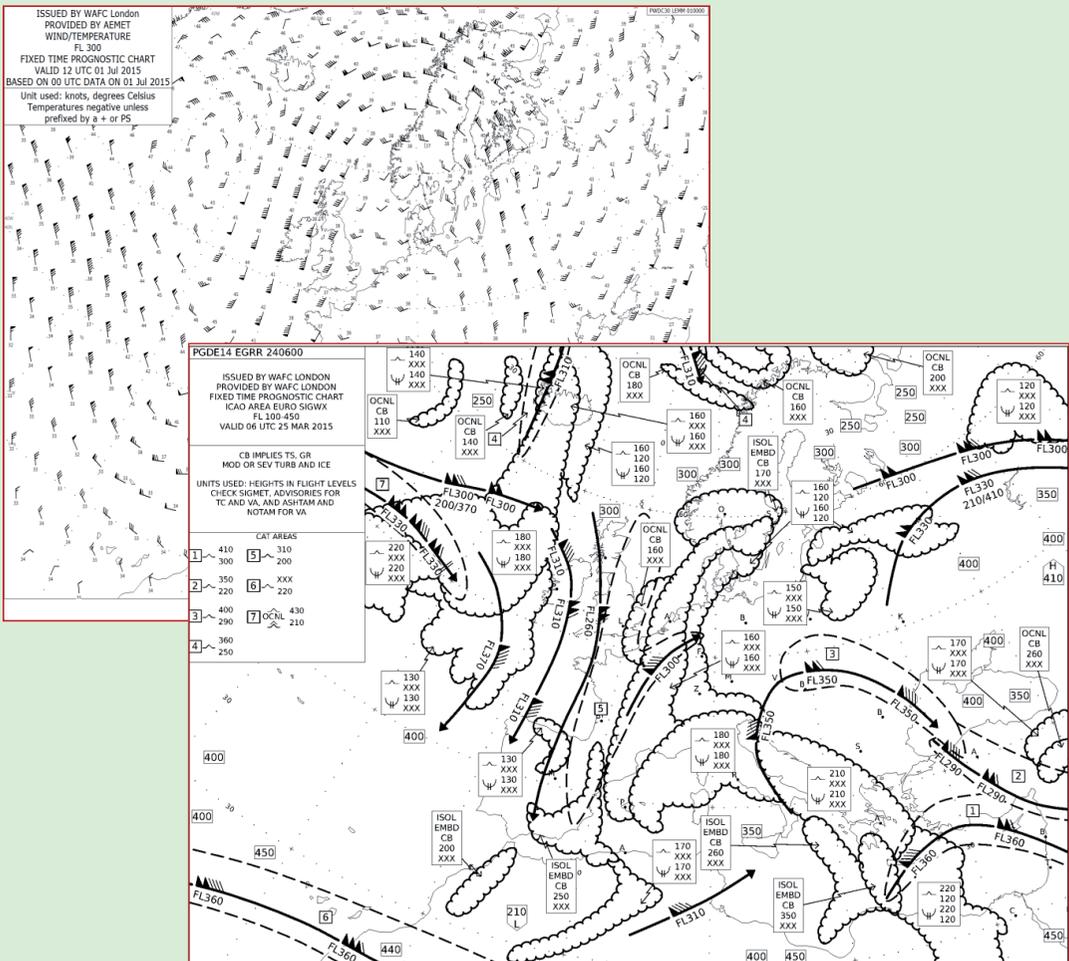
Currently, RSS mode (Rapid Scan Service) is also received, which allows images to be available every 5 minutes on the northern third of the satellite's coverage area (from Europe and North Africa to the Canary Islands). Products derived from data received from satellites are also provided, such as analysis of cloudiness, temperature and height of top cloud, global instability index, different precipitable water content products, analysis of air masses, etc.

METEOROLOGICAL INFORMATION AVAILABLE AT OMA

AERONAUTICAL CHARTS

Forecast on en-route weather phenomena concerning upper wind, temperature and humidity, direction, speed and altitude of maximum wind, tropopause level, and significant weather in the following areas and ICAO regions:

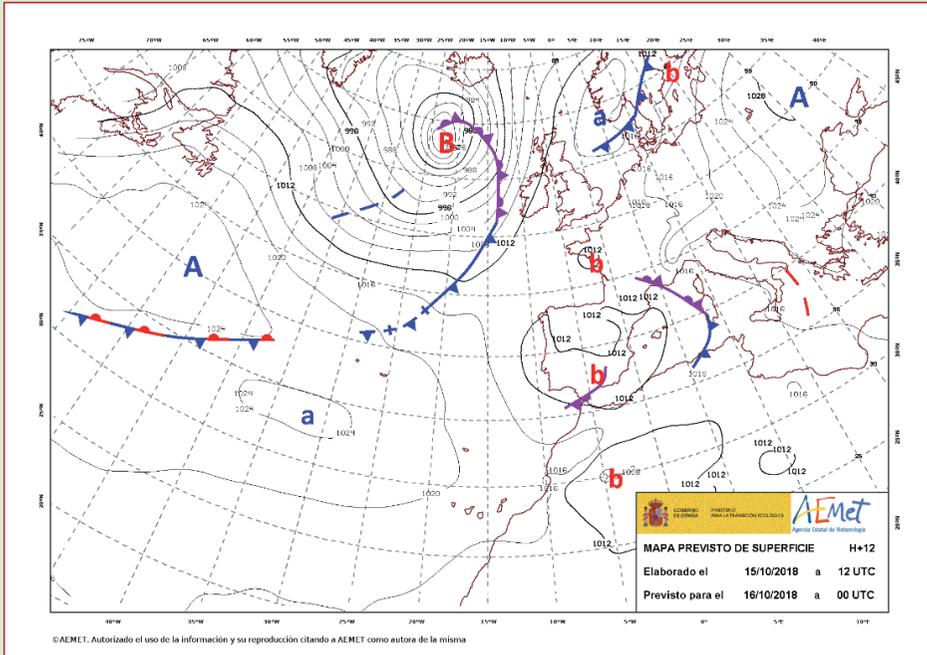
- a) The Iberian Peninsula, the Balearic Islands and the Canary Islands: significant weather chart from surface to flight level FL150. Wind and temperature at flight levels: FL20, FL50, FL100, FL150, FL180, FL300.
- b) EUR region: significant weather chart, tropopause and maximum wind FL100-450. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180
- c) NAT region: significant weather chart, tropopause and maximum wind FL250-630. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180
- d) EURSAM region: significant weather chart, tropopause and maximum wind FL250-630. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180
- e) EURAFI region: significant weather chart, tropopause and maximum wind FL250-630. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180
- f) MID region: significant weather chart, tropopause and maximum wind FL100-450. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180
- g) ASIA region: significant weather chart, tropopause and maximum wind FL250-630. Wind and temperature at 17 flight levels, from FL050 to FL530. Humidity at 5 flight levels, from FL050 to FL180



METEOROLOGICAL INFORMATION AVAILABLE AT OMA

FORECAST SURFACE WEATHER CHARTS H+12, H+24, H+36, H+48, H+60 and H+72

Forecast charts of isobars and fronts for 12, 24, 36, 48, 60 y 72 hours ahead

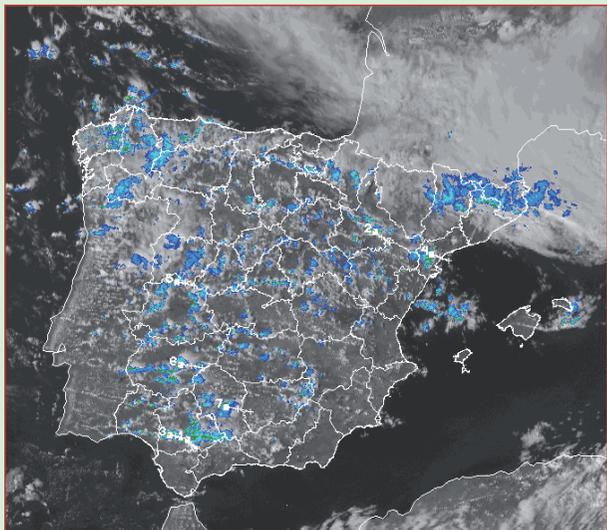


AERONAUTICAL CLIMATOLOGIES

See the corresponding section of this guide.

CONSULTATION DOCUMENTS

- Met Guide: Aeronautical meteorological information.
- Access to AMA. AMA access is available at OMA for queries by aeronautical users. See the corresponding section of this guide for more information about AMA.
- Abbreviations and ICAO codes.
- ICAO location indicators.
- Aeronautical codes



ANNEX I: AERODROME METEOROLOGICAL OFFICES (OMA)

AERODROME	ICAO LOCATION INDICATOR	METAR frequency	Period of validity of TAF (hours)	TREND	Phone number
A Coruña	LECO	h	24	YES	981 134 647
Albacete	LEAB	H	9	YES	967 556 107
Alicante-Elche	LEAL	h	24	YES	966 919 215
Almería	LEAM	h	24	NO	950 220 236
Andorra-La Seu d'Urgell	LESU	h	24	NO	973 350 582
Asturias	LEAS	h	24	YES	985 127 566
Badajoz/Talavera la Real	LEBZ	H	9	NO	924 209 632
Barcelona/El Prat	LEBL	h	24	YES	932 983 812
Bilbao	LEBB	h	24	YES	944 869 901
Burgos	LEBG	h	24	NO	947 480 727
Castellón	LECH	h	24	NO	964 578 600 Ext 2007
Córdoba	LEBA	h	9	NO	957 214 113
Fuerteventura	GCFV	h	24	NO	928 530 239
Girona	LEGE	h	24	NO	972 186 645
Gran Canaria	GCLP	h	24	YES	928 579 917
Granada/Federico García Lorca. Granada-Jaén	LEGR	h	24	NO	958 446 428
Hierro	GCHI	h	24	NO	922 551 004
Huesca	LEHC	h	24	NO	974 280 287
Ibiza	LEIB	h	24	YES	971 809 149
Jerez	LEJR	h	24	NO	956 150 069
La Gomera	GCGM	h	24	NO	922 873 019
La Palma	GCLA	h	24	NO	922 428 006
Lanzarote	GCRR	h	24	NO	928 821 897
Leon	LELN	h	9	NO	987 300 326
Lleida	LEDA	h	24	NO	973 179 500
Logroño	LELO	h	9	NO	941 279 416
Madrid/Adolfo Suárez Madrid-Barajas	LEMD	h	30	YES	913 055 782
Madrid/Cuatro Vientos	LEVS	h	9	NO	916 493 066
Málaga/Costa del Sol	LEMG	h	24	YES	952 048 890
Melilla	GEML	h	24	NO	952 698 619 952 674 416

ANNEX I: AERODROME METEOROLOGICAL OFFICES (OMA)

AERODROME	ICAO LOCATION INDICATOR	METAR frequency	Period of validity of TAF (hours)	TREND	Phone number
Menorca	LEMH	h	24	NO	971 361 545
Murcia/Región de Murcia	LEMI	h	24	NO	968 855 995.
Palma de Mallorca	LEPA	h	24	YES	971 789 319
Pamplona	LEPP	h	24	NO	948 312 784
Reus	LERS	h	24	NO	977 770 406
Sabadell	LELL	h	24	NO	937 207 724
Salamanca	LESA	h	24	NO	923 306 245
San Sebastián	LESO	h	24	NO	946 668 544
Santander/Seve Ballesteros-Santander	LEXJ	h	24	NO	942 202 114
Santiago	LEST	h	24	YES	981 599 160
Sevilla	LEZL	h	24	YES	954 674 455
Tenerife Norte	GCXO	h	24	YES	922 260 352
Tenerife Sur/Reina Sofía	GCTS	h	24	YES	922 759 205
Valencia/Manises	LEVC	h	24	YES	961 598 653
Valladolid/Villanubla	LEVD	h	24	NO	983 369 679
Vigo	LEVX	h	24	YES	986 486 962
Vitoria	LEVT	h	24	NO	945 163 543
Zaragoza	LEZG	h	24	NO	976 324 647

NOTES

METAR frequency: h (every half hour) or H (every hour).

At some OMA METAR AUTO are issued as well (see the schedules in the AIP).

See AIP for more information regarding schedules and products.

At the following aerodromes there are no OMA but they report METAR AUTO 24 hours a day. TAF is not reported, but at some of them aerodrome warnings are issued.

AERODROME/HELIPORT	ICAO LOCATION INDICATOR	METAR frequency	Aerodrome warnings	TREND
Mallorca/Son Bonet	LESB	h	YES	NO
Teruel	LETL	h	NO	NO
Algeciras	LEAG	h	YES	NO

ANNEX II: MAIN AERONAUTICAL METEOROLOGICAL OFFICES (OMPA)

List of OMPA: These offices are in charge of meteorological watch and are responsible for providing the forecast for the aerodromes. The address, telephone and fax number are included, as well as OMA and OMD with civil flights, under their responsibility.

OMPA	ADDRESS	TELEPHONE/ FAX	OMA / OMD
Las Palmas de Gran Canaria	C/ Historiador Fernando de Armas, n.º 12 Tarifa Baja 35017 - Las Palmas de Gran Canaria	Tel.: 928 430 603 Fax: 928 430 607	OMA de Fuerteventura OMA de Gran Canaria OMA de El Hierro OMA de La Gomera OMA de Lanzarote OMA de La Palma OMA de Tenerife Norte OMA de Tenerife Sur
Madrid	Parque de El Retiro. Paseo de Uruguay, 2 Apdo. 285 Madrid	Tel.: 915 045 807 Fax: 9150 45 899	OMD de Albacete OMA de Madrid/Adolfo Suarez Madrid-Barajas OMD de Madrid/Cuatro Vientos OMD de Logroño OMD de León OMD de Salamanca OMD de Valladolid/Villanubla OMA de Burgos
Santander	C/ Ricardo Lorenzo, s/n Cueto 39071 – Santander	Tel.: 942 392 464 Fax: 942 391 680	OMA de Asturias OMA de San Sebastián OMA de Santander/Seve Ballesteros-Santander OMA de A Coruña OMA de Santiago OMA de Vigo OMA de Vitoria OMA de Pamplona OMA de Bilbao
Sevilla	Avda. de Américo Vespucio, 3 Isla de la Cartuja 41092 – Sevilla	Tel.: 954 462 030 Fax: 954 461 626	OMA de Córdoba OMA de Sevilla OMA de Jerez OMD de Badajoz/Talavera la Real OMA de Almería OMA de Granada/Federico García Lorca. Granada-Jaén OMA de Málaga/Costa del Sol OMA de Melilla OMA de Murcia/Región de Murcia
Valencia	C/ Botánico Cabanilles, n.º 3 Apdo. 22043 46010 – Valencia	Tel.: 963 931 953 Fax: 963 627 102	OMA de Alicante : OMA de Barcelona : Valencia/Manises : OMA de Palma de : Mallorca : OMA de Ibiza : OMA de Menorca : OMA de Huesca : OMA de Zaragoza : OMA de Castellón : OMA de : : Barcelona : OMA de Girona : OMA de Lleida : OMA de Reus : OMA de Sabadell : OMA de Andorra- : La Seu

References of images

- Cover page. Photo taken by Fernando Bullón.
- Page 5. Photo of AEMET headquarters
- Page 6. Image of a wind indicator showing the wind data of a runway. AEMET.
- Page 7. Image of the runway of an aerodrome shown in the integrated data system of an OMA. AEMET.
- Page 8.
 - Image 1. Photo of the headquarters of the Meteorological Watch Office (OVM) of Valencia, taken by Marta Ferri, AEMET.
 - Image 2. Map showing the list of OMA, OMPA and OVM of AEMET. Image made by Fernando Asanza. AEMET.
- Page 9. Photo taken by Jordi Martín
- Page 10. Image of the main page of AMA. AEMET.
- Page 11. Experimental product of forecast of lightning on the Peninsula and the Balearic Islands (right), and chart of forecast winds for the Canary Islands at flight level 150 (left). Both images have been extracted from AMA. AEMET.
- Page 12. Image of the cover pages of some aeronautical climatologies.. AEMET.
- Page 15. Photo taken by Fernando Bullón.
- Page 16. Photo taken by Jordi Martín.
- Page 17. Photo taken by Jordi Martín.
- Page 18. Photo taken by Jordi Martín.
- Page 24: Photos of aeronautical meteorology equipment. Juan Iglesias. AEMET.
- Page 29. Mount Teide. Photo taken by Rubén del Campo Hernández (Source: AME photo galleries)
- Page 35. Photo taken by Rubén del Campo Hernández.
- Page 36. Photo taken by Isabella Osetinsky (Source: AME photo galleries)
- Page 37. Photo taken by Fernando Bullón.
- Page 40.
 - Image 1. Example of a low-level chart for the Peninsula and the Balearic Islands. AEMET.
 - Image 2. Visible satellite image. AEMET.
- Page 44. Photo taken by Jordi Martín.
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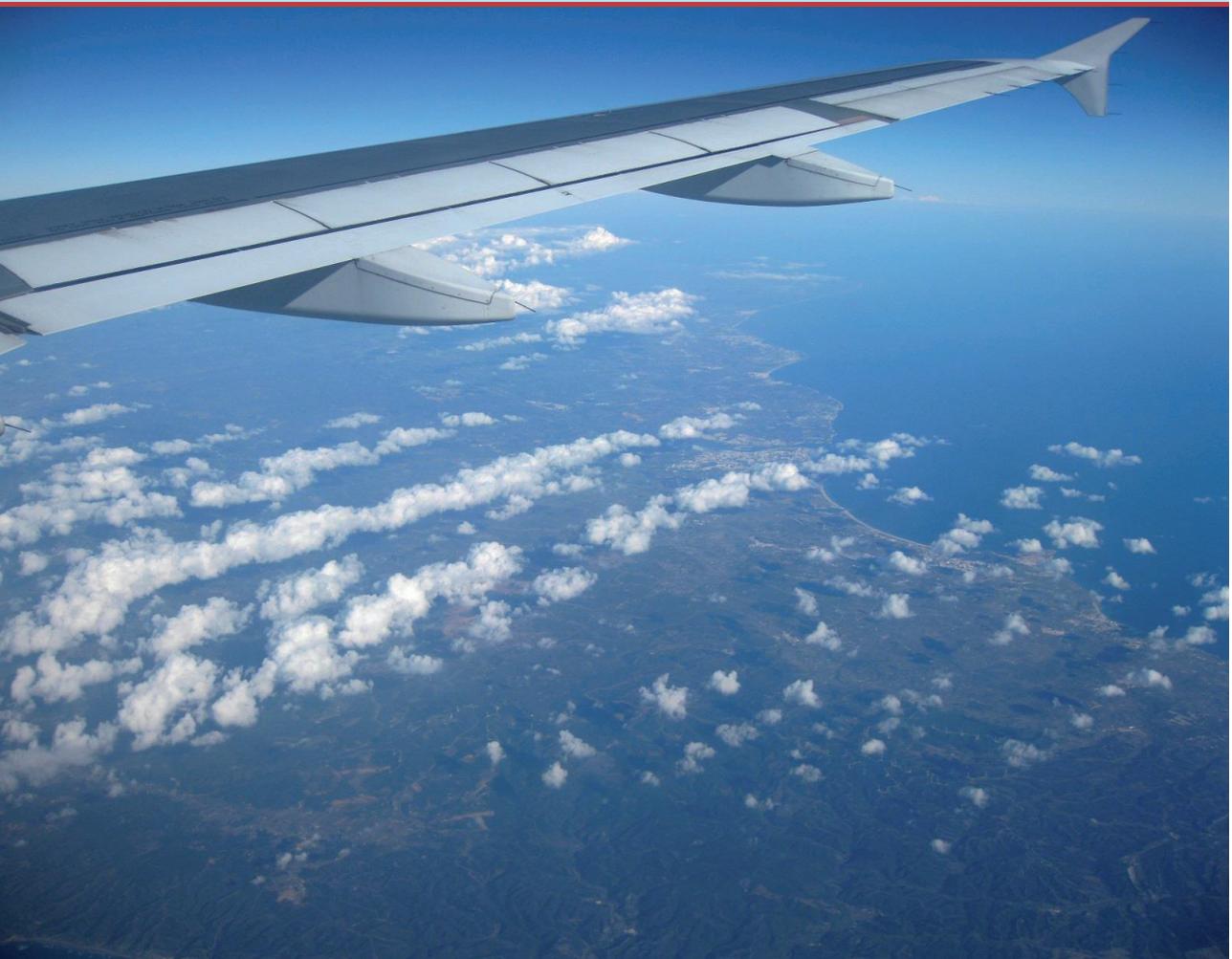
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