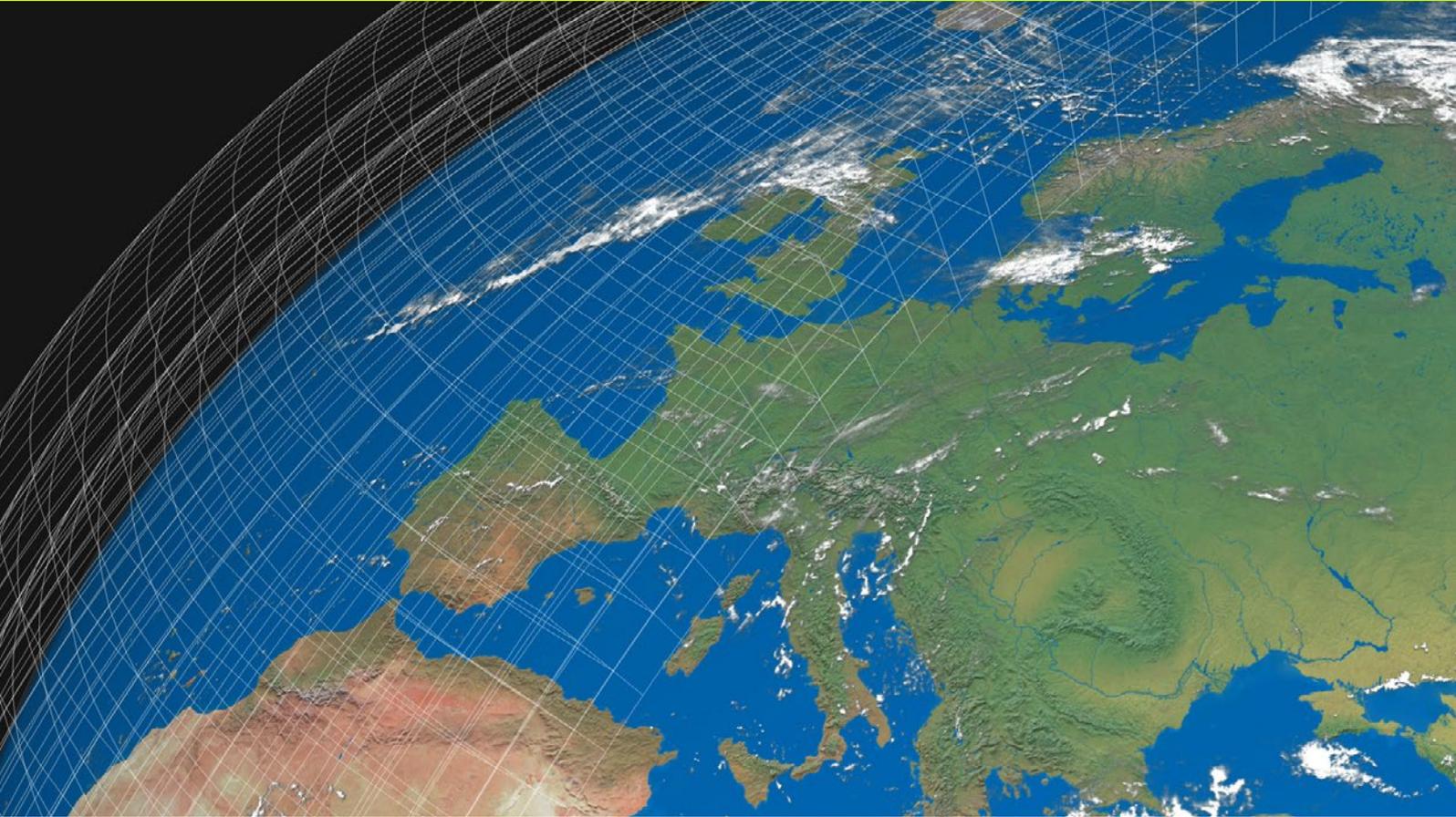


## Met Office Global and Regional Ensemble Prediction System – UK (MOGREPS-UK)



### DESCRIPTION

**The flagship Numerical Weather Prediction (NWP) model developed and used at the Met Office, is the Unified Model, the same model is used for both weather and climate prediction. For weather forecasting the Met Office runs several configurations of the Unified Model as part of its operational Numerical Weather Prediction suite.**

The regional ensemble (MOGREPS-UK) produces forecasts for an area covering the UK for the next five days.

In the UK ensemble the model parameters (temperature, pressure, wind, humidity, etc.) are forecast at grid points separated by about 2.2 km, and the model has 70 vertical levels.

The UK ensemble covers a limited area, so the global ensemble provides information on the weather entering the UK model domain through the boundaries.

To learn more about what an ensemble forecast is, please go to [What is an ensemble forecast? - Met Office](#)

NetCDF (Network Common Data Form) is an interface for array-orientated data access and a library that supports the interface. Composed of 3 components; variable, dimensions, and attributes. Variables store the data; dimensions give relevant dimension information for the variables and attributes provide auxiliary information about the variables or dataset itself.

NetCDF is used within the atmospheric and oceanic science communities and is network transparent, allowing for it to be accessed by computers that store integers characters and floating-point numbers.

Iris supports NetCDF files through reading, writing and handling. Iris implements a model based on the CF conventions, giving a format-agnostic interface for working with data. Further support on using Iris with NetCDF file: [User Guide — Iris 3.8.0 documentation](#)

## UPDATE FREQUENCY

- Runs hourly 24x per day
- Forecast length: T+126h per cycle, 5 days
- 05, 11, 17, 23 UTC cycles: 1 control run + 2 perturbed members
- All other cycles: 3 perturbed members

## PARAMETERS

Parameter	Description	Units	Precision	Vertical levels	Time steps
CAPE_mixed_layer_lowest_500m	CAPE (Convective Available Potential Energy) calculated for a mixed layer parcel where a mixed layer parcel is defined as a parcel with thermodynamic properties of the density-weighted mean of the lowest 500 m above ground level.	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
CAPE_most_unstable_below_500hPa	CAPE (Convective Available Potential Energy) calculated for the most unstable parcel where the most unstable parcel is defined as the parcel with the highest fixed level CAPE launched from any level (including screen-level=1.5m) within 500hPa of the surface pressure.	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
CAPE_surface	Value of CAPE (Convective Available Potential Energy) calculated for a surface based parcel where a surface based parcel is defined as a parcel initiated with thermodynamic properties at screen level height (1.5m) i.e. the parcel is launched from screen level.	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
CIN_mixed_layer_lowest_500m	Convective Inhibition calculated as the additional energy required to lift a mixed-layer parcel to its level of free convection. Where a mixed layer parcel is defined as parcel with thermodynamic properties of the density weighted mean of the lowest 500 m above ground level (AGL).	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
CIN_most_unstable_below_500hPa	Convective Inhibition calculated as the additional energy required to lift the most unstable parcel to its level of free convection. Where most unstable parcel is defined as the parcel with the highest fixed-level CAPE launched from any level (including screen-level) within 500 hPa of the surface pressure.	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
CIN_surface	Convective Inhibition calculated as the any additional energy required to lift a surface based parcel (i.e. a parcel launched from screen-level (1.5m)) to its level of free convection.	J kg <sup>-1</sup>	0.1	[None]	Hourly (1h-126h)
boundary_layer_depth	The planetary boundary layer (PBL), or atmospheric boundary layer (ABL), or simply the boundary layer (BL), is the lowest part of the atmosphere which is directly influenced by its contact with the surface. In this layer physical quantities such as flow velocity, temperature, and moisture display rapid fluctuations (turbulence) and vertical mixing is strong. The depth of the boundary layer can vary very markedly, particularly between day and night. The boundary layer depth is simply the current thickness of this layer.	m	1	[None]	Hourly (1h-126h)
cloud_amount_below_1000ft_AS_L	Fraction of horizontal grid square occupied by cloud below 1000 feet above sea level.	1	0.01	[None]	Hourly (1h-126h)

cloud_amount_of_high_cloud	Fraction of horizontal grid square occupied by cloud in the high-level cloud height range (from the lowest model layer containing the 5574m height level up to but excluding the lowest model layer containing 13608m height level).	1	0.01	[None]	Hourly (1h-126h)
cloud_amount_of_low_cloud	Fraction of horizontal grid square occupied by cloud in the low-level cloud height range (from the lowest model layer containing the 111m height level up to but excluding the lowest model layer containing 1949m height level).	1	0.01	[None]	Hourly (1h-126h)
cloud_amount_of_medium_cloud	Fraction of horizontal grid square occupied by cloud in the mid-level cloud height range (from the lowest model layer containing the 1949m height level up to but excluding the lowest model layer containing 5574m height level).	1	0.01	[None]	Hourly (1h-126h)
cloud_amount_of_total_cloud	Fraction of horizontal grid square occupied by cloud as diagnosed by the model cloud scheme. This is for the whole atmosphere column as seen from the surface or the top of the atmosphere.	1	0.01	[None]	Hourly (0h-126h)
cloud_amount_on_height_levels	Fraction of horizontal grid square occupied by cloud in layers centred on height levels. The levels are height above ground.	1	0.01	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (1h-126h)
evaporation_flux_at_surface	Rate of loss of water from the surface expressed as a mass flux.	kg m <sup>-2</sup> s <sup>-1</sup>	[None]	[None]	Hourly (1h-126h)
fog_fraction_at_screen_level	Here fog means a visibility of 1000 m or lower. The reduction in visibility is caused water droplets or minute ice crystals forming close to the surface. This quantity represents the fraction of horizontal grid square occupied by fog. An alternative interpretation is that this represents the fractional probability of fog being present at any location in the grid square.	1	0.1	height: 1.5 m	Hourly (0h-126h)

hail_fall_accumulation-PT01H	Implied depth of the layer of liquid water equivalent (LWE) hail produced by the model precipitation scheme and deposited on the surface in the previous time period.	m	1e-06	[None]	Hourly (1h-126h)
hail_fall_accumulation-PT15M	Implied depth of the layer of liquid water equivalent (LWE) hail produced by the model precipitation scheme and deposited on the surface in the previous time period.	m	1e-06	[None]	Every 15 mins (0h15m-126h)
hail_fall_rate	Instantaneous rate at which liquid water equivalent (LWE) hail (as a depth) has been produced by the model precipitation scheme and deposited on the surface.	m s-1	1e-09	[None]	Hourly (1h-126h)
hail_fall_rate_max-PT01H	Maximum instantaneous rate at which liquid water equivalent (LWE) hail (as a depth) has been produced by the model precipitation scheme and deposited on the surface in the previous time period.	m s-1	1e-09	[None]	Hourly (1h-126h)
height_ASL_at_base_of_convective_inflow	The height of the first level which during the most unstable parcel ascent satisfies the condition that CAPE > 100 J kg-1 and CIN > -250 J kg-1.	m	0.1	[None]	Hourly (1h-126h)
height_ASL_at_cloud_base_where_cloud_cover_2p5_oktas	Height of the base of the lowest cloud above sea level where there is at least 2.5 oktas (eighths) of cloud cover. This is also referred to as the altitude of the cloud base or (geometric) height above the geoid which is the reference geopotential surface. This to corresponds to scattered cloud.	m	0.1	[None]	Hourly (0h-126h)
height_ASL_at_cloud_base_where_cloud_cover_4p5_oktas	Height of the base of the lowest cloud above sea level where there is at least 4.5 oktas (eighths) of cloud cover. This is also referred to as the altitude of the cloud base or (geometric) height above the geoid which is the reference geopotential surface. This to corresponds to broken cloud.	m	0.1	[None]	Hourly (1h-126h)
height_ASL_at_freezing_level	Height of the 0oC isotherm (freezing level) above sea level	m	1	[None]	Hourly (0h-126h)
height_ASL_at_mixed_layer_CAPE_equilibrium_level	The height above mean sea level where the mixed layer parcel temperature equals the environment temperature above its level of free convection.	m	1	[None]	Hourly (1h-126h)
height_ASL_at_most_unstable_CAPE_equilibrium_level	The height above mean sea level where the most unstable parcel temperature equals the environment temperature above its level of free convection.	m	1	[None]	Hourly (1h-126h)
height_ASL_at_most_unstable_CAPE_initiation_level	The height above mean sea level where the most unstable parcel temperature equals the environment temperature above its level of free convection.	m	0.1	[None]	Hourly (1h-126h)
height_ASL_at_top_of_convective_inflow	The height of the first level which during the most unstable parcel ascent no longer satisfies the condition that CAPE > 100 J kg-1 and CIN > -250 J kg-1.	m	0.1	[None]	Hourly (1h-126h)
height_ASL_at_wet_bulb_freezing_level	Height of the wet bulb freezing level (i.e. where the wet bulb temperature is 0oC) above sea level. This is also referred to as the altitude of the wet bulb freezing level or (geometric) height above the geoid, which is the reference geopotential surface. Wet bulb temperature is defined as the temperature of a parcel of air cooled to saturation (100% relative humidity) by the evaporation of water into it with the latent heat supplied by the parcel.	m	1	[None]	Hourly (1h-126h)

height_of_oroography	Altitude or (geometric) height above the geoid of the surface (ground). It is worth remembering that orographic height can be negative, particularly in some of the inland sea areas (e.g. Caspian Sea at -27m and Dead Sea at -430m)	m	0.1	[None]	0h
landsea_mask	Binary indicator of whether at point is considered land (value = 1) or sea (value = 0). This is useful to identify the coastline and characterise points both for StaGE processing of other parameters and for correct interpretation of forecast data by users.	1	[None]	[None]	0h
lightning_flash_accumulation-PT01H	This represents the total (cloud-to-cloud and cloud-to-ground) lightning flashes per square metre within the previous time period. The time period is described by "xxx" using the ISO 8601 standard for representing time period (e.g. "01H" = 1 hour, "15M" = 15 minutes). The method used to generate this is based on the paper Forecasting Lightning Threat Using Cloud-Resolving Model Simulations, in which the observations were made using lightning sensors which did not discriminate between the two types of lightning. However, there are plans to try to split the two components in the model.	m-2	1e-08	[None]	Hourly (1h-126h)
pressure_at_mean_sea_level	Air pressure at mean sea level which is close to the geoid in sea areas. Air pressure at sea level is the quantity often abbreviated as MSLP or PMSL.	Pa	1	[None]	Hourly (0h-126h)
pressure_at_surface	Air pressure at the surface (lower boundary of the atmosphere).	Pa	0.1	[None]	Hourly (1h-126h)
pressure_on_height_levels	Pressure at the height levels. The levels are height above ground.	Pa	0.1	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (0h-126h)

radiation_flux_in_longwave_downward_at_surface	Longwave radiation at the surface from above directed at the ground. Longwave or terrestrial radiation is radiation emitted by the earth, either the surface or clouds or air. This has a standard wavelength distribution based on the temperature of the radiating 'surface' (i.e. much cooler than shortwave radiation, typically <300K).	W m-2	0.01	[None]	Hourly (1h-125h)
radiation_flux_in_shortwave_diffuse_downward_at_surface	Shortwave radiation at the surface from above directed at the ground. Diffuse means that the radiation has been scattered by particles in the atmosphere such as cloud droplets and aerosols.	W m-2	0.01	[None]	Hourly (1h-126h)
radiation_flux_in_shortwave_direct_downward_at_surface	Shortwave radiation at the surface from above directed at the ground. Direct means that the radiation has followed a direct path from the sun and is alternatively known as direct insolation.	W m-2	0.01	[None]	Hourly (1h-126h)
radiation_flux_in_shortwave_total_downward_at_surface	Shortwave radiation at the surface from above directed at the ground. Total means the sum of direct and diffuse solar radiation incident on the surface and is sometimes called global radiation.	W m-2	0.01	[None]	Hourly (1h-125h)
radiation_flux_in_uv_downward_at_surface	Ultraviolet radiation at the surface from above directed at the ground.	W m-2	0.01	[None]	Hourly (1h-125h)
radiation_flux_in_uv_upward_at_surface	Ultraviolet radiation at the surface directed away from the ground.	W m-2	0.01	[None]	Hourly (1h-125h)
rainfall_accumulation-PT01H	Implied depth of the rain produced by the model precipitation scheme which has been deposited on the surface in the previous time period. This excludes the rain produced by the the model convection scheme.	m	1e-06	[None]	Hourly (1h-126h)
rainfall_accumulation-PT15M	Implied depth of the rain produced by the model precipitation scheme which has been deposited on the surface in the previous time period. This excludes the rain produced by the the model convection scheme.	m	1e-06	[None]	Every 15 mins (0h15m-29h15m)
rainfall_rate	Instantaneous rate at which rain (as a depth) was being produced by the model precipitation scheme and deposited on the surface. This excludes the rain produced by the the model convection scheme.	m s-1	1e-09	[None]	Every 15 mins (0h15m-126h)
rainfall_rate_max-PT01H	Maximum instantaneous rate at which rain (as a depth) has been produced by the model precipitation scheme and deposited on the surface in the previous time period. This excludes the rain produced by the the model convection scheme.	m s-1	1e-09	[None]	Hourly (1h-126h)
relative_humidity_at_screen_level	Fractional relative humidity (ratio of the partial pressure of water vapour to the equilibrium vapour pressure of water) at screen level (1.5m above the surface).	1	0.001	height: 1.5 m	Hourly (0h-126h)

relative_humidity_on_height_levels	Fractional relative humidity (ratio of the partial pressure of water vapour to the equilibrium vapour pressure of water) on height above ground levels.	1	0.001	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (1h-126h)
sensible_heat_flux_at_surface	Exchange of heat between the surface and the air by motion of air, also called turbulent heat flux.	W m-2	0.1	[None]	Hourly (1h-126h)
snow_depth_water_equivalent	Liquid water equivalent (lwe) depth of the snow lying on the surface (ground). Typically water is 10 times as dense as snow, so multiplying by 10 gives an approximate depth of the snow, although wet snow can be significantly denser and powder snow much less dense.	m	0.0001	[None]	Hourly (1h-126h)
snowfall_accumulation-PT01H	Implied depth of the (LWE) snow (as a depth) produced by the model precipitation scheme and deposited on the surface in the previous time period. This excludes the snow produced by the the model convection scheme.	m	1e-06	[None]	Hourly (1h-126h)
snowfall_accumulation-PT15M	Implied depth of the (LWE) snow (as a depth) produced by the model precipitation scheme and deposited on the surface in the previous time period. This excludes the snow produced by the the model convection scheme.	m	1e-06	[None]	Every 15 mins (0h15m-126h)
snowfall_rate	Instantaneous rate at which liquid water equivalent (LWE) snow (as a depth) was produced by the model precipitation scheme and deposited on the surface. This excludes the snow produced by the the model convection scheme.	m s-1	1e-09	[None]	Every 15 mins (0h15m-126h)
snowfall_rate_max-PT01H	Maximum instantaneous rate at which liquid water equivalent (LWE) snow (as a depth) has been produced by the model precipitation scheme and deposited on the surface in the previous time period. This excludes the snow produced by the the model convection scheme.	m s-1	1e-09	[None]	Hourly (1h-126h)

soil_temperature_on_soil_levels	Temperature of the soil at a soil depth level.	K	0.1	depth: 0.05 0.225 0.675 2.0 m	Hourly (1h-126h)
temperature_at_screen_level	Instantaneous air temperature at screen level (1.5m).	K	0.01	height: 1.5 m	Hourly (0h-126h)
temperature_at_screen_level_max-PT01H	Maximum instantaneous air temperature at screen level (1.5m) in the previous time period.	K	0.01	height: 1.5 m	Hourly (1h-126h)
temperature_at_screen_level_min-PT01H	Maximum instantaneous air temperature at screen level (1.5m) in the previous time period.	K	0.01	height: 1.5 m	Hourly (1h-126h)
temperature_at_surface	Temperature at the surface interface between the air and the ground.	K	0.1	[None]	Hourly (1h-126h)
temperature_of_dew_point_at_screen_level	Instantaneous dew point temperature (temperature at which a parcel of air reaches saturation upon being cooled at constant pressure and specific humidity) at screen level (1.5m).	K	0.01	height: 1.5 m	Hourly (0h-126h)
temperature_on_height_levels	Air temperature on pressure levels. The levels are height above ground.	K	0.1	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (0h-126h)
total_radar_reflectivity_max_in_column	Simulated 2-d field of the maximum reflectivity value in the vertical. "total" refers to the fact that it is a sum of a number of components: graupel radar reflectivity, ice aggregate radar reflectivity, ice crystal radar reflectivity, rain radar reflectivity and liquid cloud radar reflectivity.	dBZ	0.1	[None]	Hourly (1h-126h)

total_radar_reflectivity_on_pressure_levels	Simulated 3-d values of reflectivity on the standard set of pressure levels. "total" refers to the fact that it is a sum of a number of components: graupel radar reflectivity, ice aggregate radar reflectivity, ice crystal radar reflectivity, rain radar reflectivity and liquid cloud radar reflectivity.	dBZ	0.1	pressure: 100000.0 95000.0 92500.0 90000.0 85000.0 80000.0 75000.0 70000.0 60000.0 50000.0 45000.0 40000.0 37500.0 35000.0 32500.0 30000.0 27500.0 25000.0 22500.0 20000.0 17500.0 15000.0 12500.0 10000.0 7000.0 5000.0 4000.0 3000.0 2000.0 1000.0 Pa	Hourly (1h-126h)
visibility_at_screen_level	Horizontal distance at which something can be seen horizontally from screen level (1.5m).	m	1	height: 1.5 m	Hourly (0h-126h)
wet_bulb_potential_temperature_on_pressure_levels	Wet bulb potential temperature on pressure levels. Wet bulb potential temperature is defined as the temperature that a parcel of air would have if it were brought down to the standard pressure of 1000hPa following a saturated adiabatic lapse rate.	K	0.1	pressure: 85000.0 70000.0 50000.0 Pa	Hourly (1h-126h)
wind_direction_at_10m	Wind at 10m above the surface is defined as a two-dimensional (horizontal) air velocity vector with no vertical component. In meteorological reports the direction of the wind vector is given as the direction from which it is blowing. Note: This with wind speed at 10m replaces x wind at 10m and y wind at 10m.	degrees	0.1	height: 10.0 m	Hourly (0h-126h)

wind_direction_on_height_levels	Wind on a height levels is defined as a two-dimensional (horizontal) air velocity vector with no vertical component. In meteorological reports the direction of the wind vector is given as the direction from which it is blowing. The levels are height above ground.	degrees	0.1	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (0h-126h)
wind_gust_at_10m	Diagnosed instantaneous wind gust at 10m. This can be considered as the extreme rather than steady wind speed that might be experienced at this specific time.	m s-1	0.1	height: 10.0 m	Hourly (1h-126h)
wind_gust_at_10m_max-PT01H	Maximum diagnosed instantaneous wind gust at 10m in the previous time period. This can be considered as the extreme wind speed that might be experienced in this period. The time period is described by "xxx" using the ISO 8601 standard for representing time period (e.g. "01H" = 1 hour, "15M" = 15 minutes).	m s-1	0.1	height: 10.0 m	Hourly (1h-126h)
wind_speed_at_10m	Wind at 10m above the surface is defined as a two-dimensional (horizontal) air velocity vector with no vertical component. The speed is the magnitude of velocity.	m s-1	0.1	height: 10.0 m	Hourly (0h-126h)
wind_speed_at_10m_max-PT01H	Maximum diagnosed instantaneous wind speed at 10m in the previous time period. This can be considered as the extreme wind speed that might be experienced in this period. The time period is described by "xxx" using the ISO 8601 standard for representing time period (e.g. "01H" = 1 hour, "15M" = 15 minutes).	m s-1	0.1	height: 10.0 m	Hourly (1h-126h)

wind_speed_on_height_levels	Wind on a height levels is defined as a two-dimensional (horizontal) air velocity vector with no vertical component. The speed is the magnitude of velocity. The levels are height above ground.	m s-1	0.1	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (0h-126h)
wind_vertical_velocity_on_height_levels	Speed of the vertical component of the air motion at a height levels. Upwards is positive and downwards is negative. The levels are height above ground.	m s-1	0.001	height: 5.0 10.0 20.0 30.0 50.0 75.0 100.0 150.0 200.0 250.0 300.0 400.0 500.0 600.0 700.0 800.0 1000.0 1250.0 1500.0 1750.0 2000.0 2250.0 2500.0 2750.0 3000.0 3250.0 3500.0 3750.0 4000.0 4500.0 5000.0 5500.0 6000.0 m	Hourly (1h-126h)

wind_vertical_velocity_on_pressure_levels	Speed of the vertical component of the air motion at a pressure levels. Upwards is positive and downwards is negative.	m s-1	0.001	pressure: 100000.0 95000.0 92500.0 90000.0 85000.0 80000.0 75000.0 70000.0 60000.0 50000.0 45000.0 40000.0 37500.0 35000.0 32500.0 30000.0 27500.0 25000.0 22500.0 20000.0 17500.0 15000.0 12500.0 10000.0 7000.0 5000.0 4000.0 3000.0 2000.0 1000.0 Pa	Hourly (1h-126h)
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