



Manual for RSMC Products

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General Specification of Products

- In all products Countries borders and Provincial divisions of all countries are plotted
- Forecast range is up to 120 hour and in most of products time step is 3 hours except two parameters “1hour Accumulated Precipitation” and “1hour Convective Precipitation” which time steps are 1 hour.
- Most products are generated as composite maps that simultaneously depicts 2 or more parameters at one map. This feature makes forecasting process faster, easier and more reliable

Product Name	Description
{PL}-hPa Height, Wind Pressure Levels: {300,500,700,850}	Product Category: Upper_Air: Height, Wind, Temperature / Height and Wind Explanation: This is a composite map which visualizes 3 parameters at standard pressure levels: Wind Speed (shaded), Wind barbs and Geopotential Height (contours). By combining Geopotential Height and Wind Speed in a single map, it eliminates the need for a standalone Height chart. Applicability: Jets streams, atmospheric waves (including trough and ridges) at standard pressure levels are simultaneously visualized. Forecast maps: 3-hour time step ,120-hour Forecast rang.
{PL}-hPa Temperature, Height, Wind Pressure Levels: {300,500,700,850}	Product Category: Upper_Air: Height, Wind, Temperature / Temperature and Wind Explanation: This is a composite map which visualizes 3 parameters at pressure levels: Temperature (shaded), wind (barbs) and Geopotential Height (contours). Applicability: Temperature, cold and warm air advection and atmospheric waves (including trough and ridges) at different pressure levels are Simultaneously visualized. Forecast maps: 3-hour time step ,120-hour Forecast rang.
{PL}-hPa Relative Humidity Pressure Levels: {300,500,700,850}	Product Category: Upper_Air: Moisture Explanation: This composite map visualizes three key atmospheric parameters at pressure levels: Relative Humidity > 50% (shaded), wind barbs and Geopotential Height (contours) across pressure levels. Applicability: This single map displays Relative Humidity (Areas of high Relative Humidity indicate regions likely for cloudiness and enhanced water vapor),” Geopotential Height” (for synoptic-scale features) and wind patterns are visualized simultaneously. It is useful for identifying humid air masses, frontal zones, and potential areas of precipitation. Forecast maps: 3-hour time step ,120-hour Forecast rang.

Product Name	Description
{PL}-hPa Vorticity, Height Pressure Levels: {300,500,700,850}	Product Category: Upper_Air: Dynamics / Vorticity and Height Explanation: This product is a composite map visualizes 2 parameters at pressure levels: Relative Vorticity shaded and wind barbs. Applicability: Relative Vorticity is an important prognostic parameter which mimics air parcel rotations and vertical motions. When composite with wind barbs, forecasters can diagnose positive and negative Vorticity advection areas. Forecast maps: 3-hour time step ,120-hour Forecast rang.
{hh}-Accumulated Precipitation hh: {1h,3h,6h,12h,24h} h:Hour	Product Category: Precipitation Explanation: This product shows accumulated precipitation with different accumulation time(hh). Time steps of each product is the same as Accumulation time(hh) Applicability: One hour accumulated precipitation(hh=1h) product, shows precipitation intensity. Different accumulated hours precipitation covers from short range to 1 day which have different usage for forecasters.
{hh}-Convective Precipitation hh: {1h,6h,24h} h:Hour	Product Category: Precipitation Explanation: This product shows accumulated Convective precipitation with different accumulation time(hh). Time steps of each product is the same as Accumulation time(hh) so when viewing in sequence each image is precipitation of next “hh” hour except for 24-hour product which time step is 12 hour. Applicability: Different accumulated hours Convective precipitation covers short range (1 and 6 hour) and 1 day which are more commonly used by forecasters.

Product Name	Description
{hh}-Sonwfall hh: {3h,6h,12h,24h} h:Hour	Product Category: Snow Precipitation Explanation: This product shows accumulated Convective precipitation with different accumulation time(hh). Time steps of each product is the same as Accumulation time(hh) so when viewing in sequence each image is precipitation of next “hh” hour except for 24-hour product which time step is 12 hour. Applicability: Different accumulated hours Snow precipitation covers from short range to 1 day which have different usage for forecasters.
Sea Level Pressure (short name: SLP)	Product Category: Surface Explanation: Mean Sea Level Pressure is plotted both shaded and contour composite with <u>surface (lowest WRF Model Level) wind</u> velocity as barb. Applicability: It visualizes prognostic surface pressure and wind simultaneously so it has added value respect to only MSLP map.
2m-Temperature, Wind (short name: T2m)	Product Category: Surface Explanation: 2-meter temperature is shaded and superimposed with surface wind as barb. Temperature is plotted in Celsius with 3 centigrade degree increment
2 m-Dewpoint Temperature, Wind (short name: Td2m)	Product Category: Surface Explanation: 2-meter Dewpoint Temperature from 6 to 36 Celsius degree is shaded and superimposed with surface wind as barb and Sea Pressure as contour. Dewpoint Temperature is plotted in Celsius with 3 centigrade degree increment Applicability: Assuming threshold 6 Centigrade degree is crucial for eliminating Insignificant Dewpoint values. Superimposed with wind and surface pressure clarifies surface moisture advections.

Product Name	Description
2m-Relative Humidity, 10m-Wind speed (short name: rh2_w10)	Product Category: Surface Explanation: 2-meter Relative Humidity (%) from 50% to 100% is shaded and superimposed with 10-meter wind speed as barb. Applicability: 2-meter Relative Humidity superimposed with wind clarifies surface moisture advections.
10-meter U wind (short name: U10m)	Product Category: Surface Explanation: U-component of 10-meter wind (10m Zonal wind) is plotted as barb Applicability: It visualizes Zonal wind of 10 meter
10-meter V wind (short name: V10m)	Product Category: Surface Explanation: V-component of 10-meter wind (10m Meridional wind) is plotted as barb Applicability: It visualizes Meridional wind of 10 meter
MCAPE: Maximum CAPE	Product Category: Instability Explanation: Definition: Maximum CAPE is the highest theoretical amount of Convective Available Potential Energy (CAPE) that an air parcel can have on a given atmospheric sounding. It is found by testing different possible parcel origins (starting points) throughout the lower atmosphere to see which one yields the most extreme instability. Applicability: A CAPE measures the amount of energy available to accelerate a rising air parcel vertically. It's a key indicator of storm potential. Higher CAPE generally means: Stronger updrafts and increased potential for severe weather (large hail, damaging winds, tornadoes).

Product Name	Description
Low Cloud Cover (short name: Cld_Low)	Product Category: Cloud Forecast Explanation: Low Cloud Cover (%) is shaded with scale from 0 to 100 percentage Applicability: Low Cloud Cover (%) shows low levels cloudiness and is crucial in aviation weather forecast as well as realizing weather fronts
Mid Cloud Cover (short name: Cld_Mid)	Product Category: Cloud Forecast Explanation: Middle Cloud Cover (%) is shaded with scale from 0 to 100 percentage Applicability: Middle Cloud Cover (%) shows low levels cloudiness and is crucial in aviation weather forecast as well as realizing weather fronts

❖ The map of following parameters is produced and some of them are in recommended list of
Appendix 2.2.3: limited-area deterministic NWP mandatory products

Product Name	Description
500-hPa Vertical Velocity, Height (short name: VV500)	Product Category: Upper Air: Dynamics → Vertical Velocity and Height Explanation: Medium level Vertical motions is categorized in “Dynamic” diagnosis parameters Applicability: This product gives valuable information about waves structure and their ascend and descent strength of air parcels for weather forecasters
700-hPa Vertical Velocity, Height (short name: VV700)	Product Category: Upper Air: Dynamics → Vertical Velocity and Height Explanation: Lower mid-level Vertical motions is categorized in “Dynamics” diagnosis parameters Applicability: This product gives valuable information about waves structure and their ascend and descent strength of air parcels for weather forecasters

MCIN: Maximum CIN	Product Category: Severe Weather / Instability Explanation: Definition: Most Unstable Convective Inhibition (MCIN), is the amount of convective inhibition (CIN) experienced by the same specific air parcel that yields the Maximum CAPE (MUCAPE) Applicability: It answers the question: "How strong is the 'cap' or 'lid' that is holding back the atmosphere's most unstable air parcel from rising?" MCIN is not the maximum value of CIN found in the sounding Instead, MCIN is specifically the CIN value for that winning parcel—the one that gives MCAPE.
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