***Marine Weather Forecaster Performance Criteria 1.1 and 2.1: Direct Observation***

***C1.1 Maintain weather watch over the marine weather situation, evolving significant weather phenomena and, where available, advisories issued by other meteorological services and model guidance***

***C2.1 Analyse and diagnose the marine weather situation as required for the preparation and issue of forecasts***

***Performance criterion comments:***

These criteria include selection of marine weather observation data products and forecaster analysis and diagnosis of the current meteorological situation in space and time.

**Scenario**:

During an assessment period, for example, one or more forecast shifts, the forecaster is asked to analyse and diagnose the weather situation, considering synoptic surface features. In particular, the forecaster analyses weather parameters and features significant to marine meteorology and marine services users.

For direct observation C1.1, the forecaster can be asked to apply a “think-aloud” protocol to describe decisions of data products viewed and judgements of the situation that can be made based on the data.

**Evidence of competency checklist**:

The forecaster utilizes available data such as

* surface data
* in-situ ocean observations
* NWP analyses
* remote sensed data
* radar imagery
* tide charts
* other available data
* advisories issued by other meteorological services and regional centers

to construct a comprehensive analysis of

* precipitation
* restrictions to visibility
* surface winds, including areas of strong winds
* areas of significant weather
* synoptic features, including large-scale motion
* sea state
* interactions with tide and river run-off, especially near the coast
* other pertinent features

The forecaster uses meteorological knowledge to

* determine the most plausible meteorological processes at work that would produce the observed weather conditions.
* explain the meteorological processes at work
* explain how the observed weather parameters support the diagnosis, including
	+ precipitation
	+ restriction to visibility
	+ surface winds
	+ state of the sea
	+ tide and surge
	+ other relevant information and impactful features

Additional criteria as presented in WMO-No. 1209 for consideration in the assessment:

* Knowledge of marine meteorological products (routine and non-routine), their issue times and the priorities applied in the region;
* Knowledge of non-routine weather conditions that trigger gale warnings, special marine warnings, storm warnings, wave warnings, surf warnings and advisories;
* Knowledge of meteorological analysis techniques (subjective and objective);
* The ability to interpret:
	+ Radar and satellite imagery to identify fog, rapid cyclogenesis, frontogenesis, severe convective systems, tropical cyclones, thunderstorms, squalls, sea ice and other potentially dangerous phenomena;
	+ Numerical weather prediction (NWP) guidance (including Ensemble Prediction Systems (EPS)), marine meteorological products and other types of objective guidance, and their assimilation in the preparation of forecasts and warnings;
	+ Observed variables and parameters, when there are differences between automatic sensor technologies and manual observing techniques, and their impact on forecast and warning products;
	+ Coded real-time raw data including buoy and ship reports.
* Knowledge of relevant observing systems, platforms, and sensors that may include remote sensing (satellite altimeters, scatterometers, microwave sensors, radar, lightning detection systems); in-situ sensors (anemometers, tide gauges, moored wave buoys, drifting buoys, bottom pressure sensors); human observing procedures (ship, shore) and how their advantages and limitations vary with respect to prevailing seasonal and meteorological conditions;
* Knowledge of marine meteorological products (routine and non-routine), their issue times and the priorities applied in the region;
* Knowledge of non-routine weather conditions that trigger gale warnings, special marine warnings, storm warnings, wave warnings, surf warnings and advisories;
* Knowledge of meteorological analysis techniques (subjective and objective);
* The ability to interpret:
	+ Radar and satellite imagery to identify fog, rapid cyclogenesis, frontogenesis, severe convective systems, tropical cyclones, thunderstorms, squalls, sea ice and other potentially dangerous phenomena;
	+ Numerical weather prediction (NWP) guidance (including Ensemble Prediction Systems (EPS)), marine meteorological products and other types of objective guidance, and their assimilation in the preparation of forecasts and warnings;
	+ Observed variables and parameters, when there are differences between automatic sensor technologies and manual observing techniques, and their impact on forecast and warning products;
	+ Coded real-time raw data including buoy and ship reports.
* Knowledge of relevant observing systems, platforms, and sensors that may include remote sensing (satellite altimeters, scatterometers, microwave sensors, radar, lightning detection systems); in-situ sensors (anemometers, tide gauges, moored wave buoys, drifting buoys, bottom pressure sensors); human observing procedures (ship, shore) and how their advantages and limitations vary with respect to prevailing seasonal and meteorological conditions;
* Knowledge of bathymetry, local topography, coastal geomorphology, marine climatology and local weather systems and their potential impact on winds, waves and other phenomena, such as abnormal water level or currents, in the forecast area of responsibility;
* The ability to perform manual and subjective analyses (including techniques for analysis in data-sparse areas);
* The ability to perform analysis on weather-related images;
* The ability to perform statistical data analyses;
* The ability to apply statistical analysis and other informational techniques to data that have a geographical or geospatial aspect.