

# Ocean State Forecasting and Advisory System

Ocean information is critical for effective management of maritime activities, such as shipping, maritime recreations, fisheries, and disaster preparedness in the islands and coastal regions. Most RIMES Member States in the Indian Ocean, South China Sea, and South Pacific Ocean have access only to forecasts at coarse resolutions (global and regional scales), which are hardly interpreted and operationally used by user agencies in the countries. Hence, strengthening capacities of these countries in this region to provide operational customized ocean forecasts is necessary through RIMES in collaboration with INCOIS, the leading ocean information services institution in the region.

OSFAS is web-based tool developed for providing customized forecast information, as well as real-time or near-real-time observation data, on local ocean/ marine conditions. Key aspects of the tool include customizable system and translation of forecast products to information that can be easily understood by users. Warning bulletins for provision of advisories on 3-day marine forecasts are disseminated through emails. The tool also incorporates a user-friendly feedback system that can be used for validating forecast information.

## OSFAS Components and Functionality

### 1. Customization of Ocean/Marine Forecast Information

Existing data and updated local bathymetric data are integrated by INCOIS into its forecasting system to generate desired products for a range of users - locally and regionally - in each country. These products include 72-hour wave and swell height, direction, and period, sea surface current and temperature, and wind speed from INCOIS' Indian Ocean Forecast System (INDOFOS).

RIMES is working closely with national agencies to integrate all locally available real-/near real-time ocean observations into a regional server, for use in forecast verification and modeling purposes. Additionally, RIMES is facilitating user feedback, to guide further improvements.

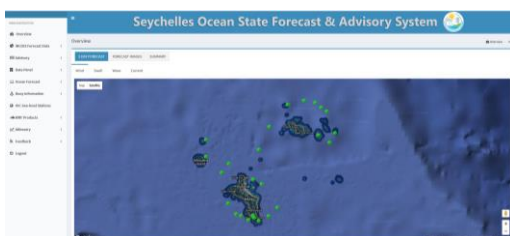


Figure 1. OSFAS interface

Key features and capabilities of the system, include:

- Updated local bathymetry data integrated by INCOIS into its forecasting system
- Provision of 72-hour wave and swell height, direction, and period, sea surface current and wind speed from INCOIS' Indian Ocean Forecast System (INDOFOS)
- Customizable system and user-friendly interface
- Customized forecast extent
- Provision of coastal and location-specific marine forecast information
- Real-time marine observation data acquisition system
- Near real-time tracking of buoy location and alert messaging service in case of buoy drift
- Provision of real-time sea level data (IOC)
- Provision of weather forecast products (e.g. rainfall, temperature, wind, MSL pressure)
- Provision of near-real time satellite data (e.g. altimetry, sea surface current, sea surface temperature, sea surface wind, salinity, and rainfall)
- User feedback system for allowing users to upload real-time data
- Formulation of warning bulletins for provision of advisories on 3-day ocean/marine forecast
- Warning dissemination process through emails

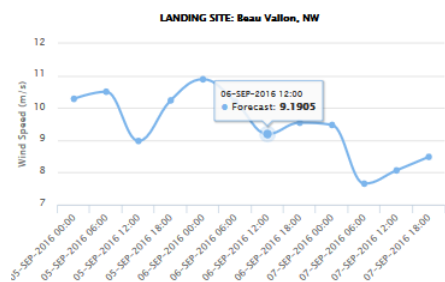


Figure 2. 3-day forecast on wind speed



Buoy observation data, used to validate of forecast information, may be downloaded at any specific date range. Near-real time tracking of buoy location and alert messaging are incorporated in the system to ensure that the buoy is in place.

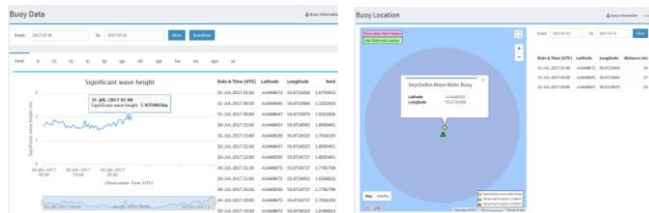


Figure 3. Buoy tracking system

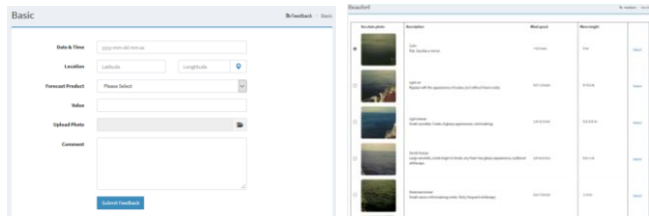


Figure 4. Feedback system: Basic (left) and Beaufort (right)

A key feature of the tool is its customizable system. Forecast extent and specific locations of forecasts may be defined by the user. In addition, a summary table is provided for a quick look on forecasts for all user-specified forecast points.

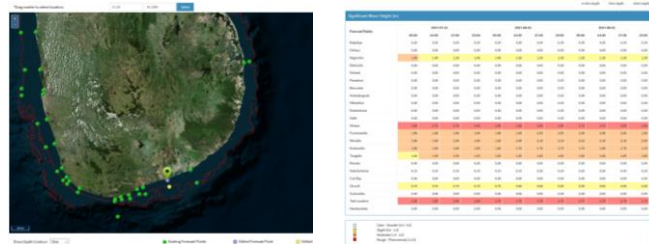


Figure 5. User-specified forecast locations (left) and summary table (right)

## 2. Advisory system

Forecast parameters are categorized according to known standard scales, e.g. Beaufort scale for wind speed, and Douglas scale for wave heights. Alert levels and categories may be defined by the user, for providing advisories. Advisory bulletins may be generated and disseminated via email and/or SMS.

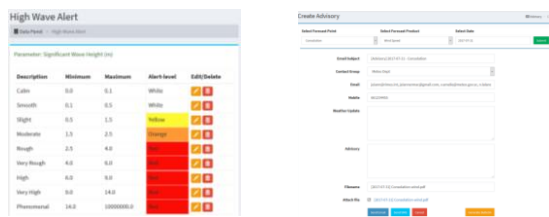


Figure 6. User-defined alert levels (left) and advisory composition (right)



Figure 7. Advisory bulletin for 3-day wave forecast

## 3. WRF products

WRF products provides forecast data on rainfall, temperature, wind and MSL pressure. Short term weather information (3-5 days lead time) are generated on a daily basis to monitor extreme weather events in the Afro-Asian region.

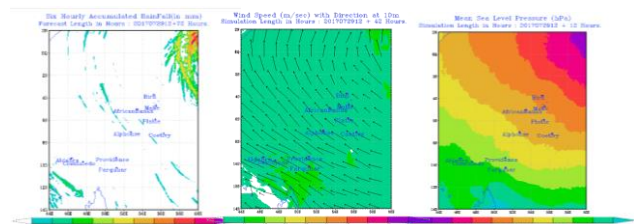


Figure 8. WRF products

## 4. Real-/near-real time observation data

Real-time sea level data (IOC) and near-real time satellite data are provided as additional sources of information for forecast verification, calibration and trend analysis.

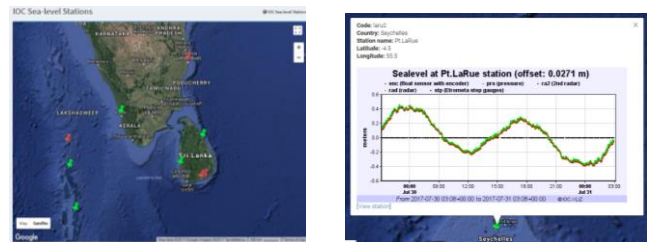


Figure 9. Real-time sea level observation data

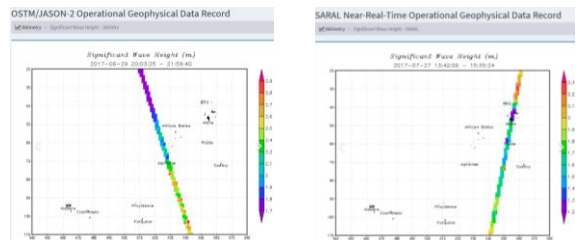


Figure 10. Near real-time satellite data on sea level

The **Regional Integrated Multi-Hazard Early Warning System (RIMES)** is an international and intergovernmental institution that is owned and managed by its Member States for the generation and application of early warning information. RIMES helps to build capacity of Member States in the observation and monitoring of seismic, tsunami, oceanic, meteorological, hydrological, and climate phenomena, and in the generation and communication of associated risks, for appropriate and timely user responses to warning.