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COASTAL CRETE: A high-resolution operational forecasting system for the coastal area of Crete, Eastern Mediterranean

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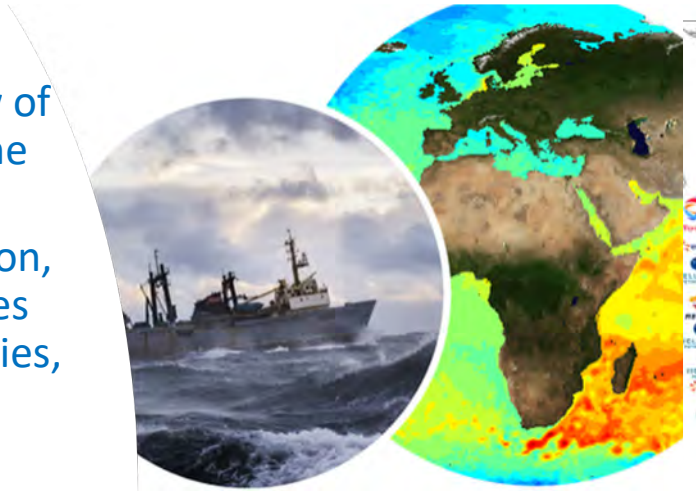
COASTAL & MARINE RESEARCH LABORATORY IACM - FORTH

ORION Joint Research & Development Center

MEEO Meteorological Environmental Earth Observation

COASTAL CRETE
at a glance

- An area of increasing interest in view of the oil/gas exploration activities in the broader sea area of the island
- Ever increasing need of high-resolution, reliable data, information and services for local end-users, e.g. port authorities, coast guard, tourism industry
- Dissemination of Copernicus Marine Products and Service to local end users



COASTAL CRETE
at a glance

- A high-resolution operational forecasting system for the coastal area of Crete
- Implements advanced numerical hydrodynamic and sea state models nested in CMEMS Med MFC
- Provides, 5-days hourly and 6-hourly averaged forecasts of currents, sea temperature, salinity and waves
- Downscaled high-resolution COASTAL CRETE forecasts are used in maritime safety and coastal management & monitoring

On demand simulation of different response actions in case of a pollution accident.

Early warnings and alerts (e.g. warn me when the waves are higher than 5 meters from north).

COASTAL CRETE
context and description

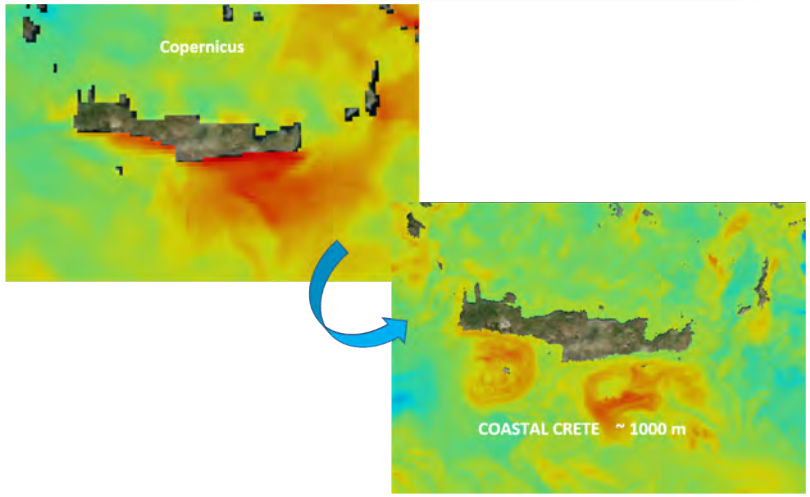
EMODNET Bathymetry & local measurements

Copernicus Med MFC initial & boundary conditions

SKIRON weather forecasting system for surface forcing

EO SST, Sea level anomaly Mooring time series

COASTAL CRETE high-resolution (~1000) hydrodynamic model: forecasts of currents, SSH, T, S



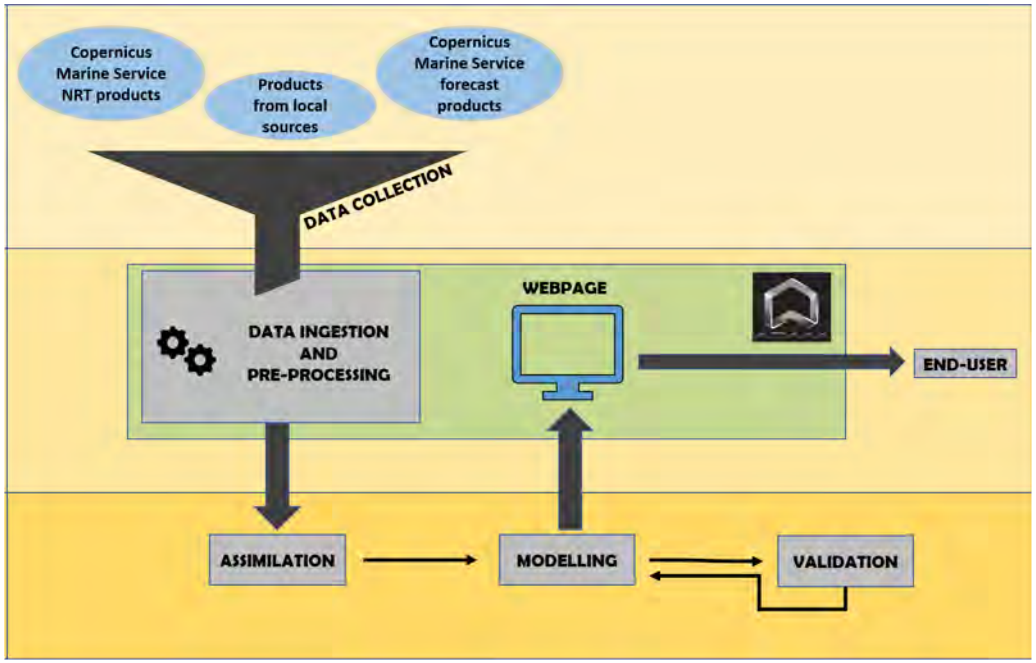
COASTAL CRETE wave model (the latest ECMWF WAM CY46R1 parallel version) series of nested models of increasing resolution - (~1000 m to ~250 m)-

Ocean variables

Maps, information services, warning & alerts

COASTAL CRETE
context and description

- Copernicus Marine Service products play a key role in the operational forecasting chain providing the required initial and open boundary conditions to run the series of nested hydrodynamic and wave models



Analysis and Forecast

Mediterranean Sea Physics Analysis and Forecast
MEDSEA_ANALYSIS_FORECAST_PHY_006_013

Mediterranean Sea Waves Analysis and Forecast
MEDSEA_ANALYSIS_FORECAST_WAV_006_017

Observations

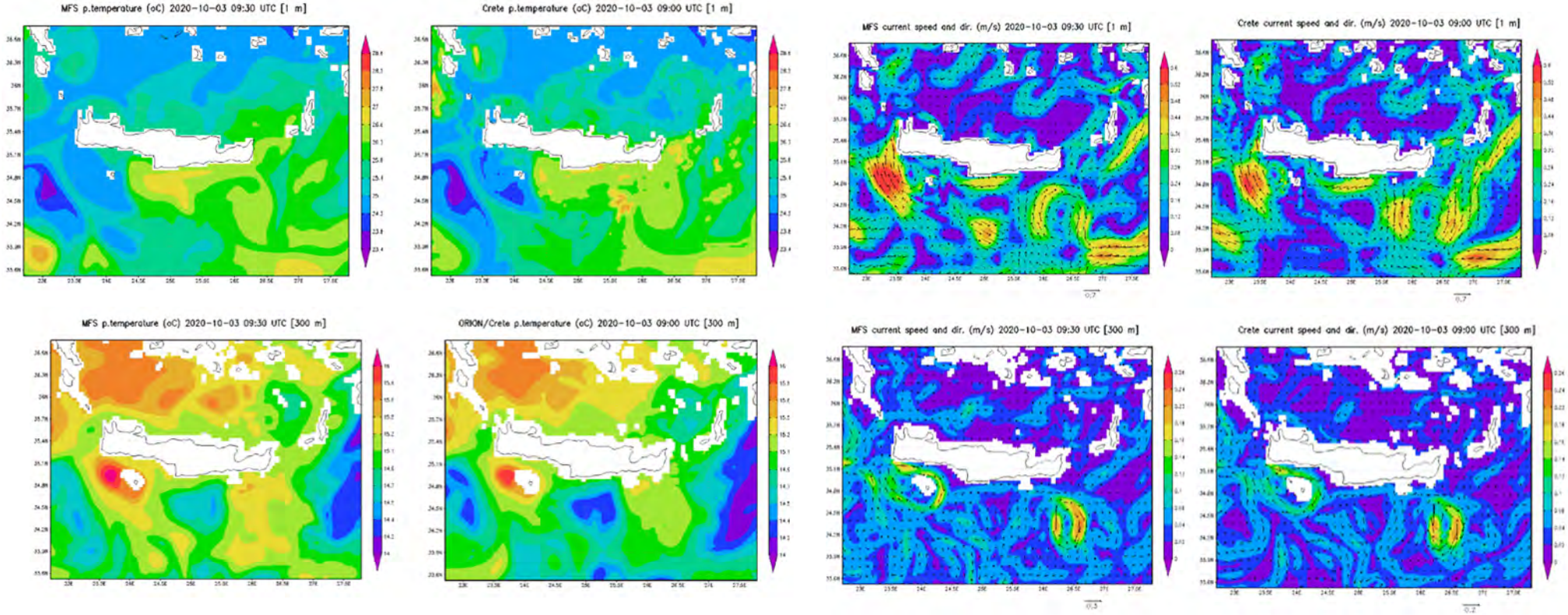
✓ Mediterranean Sea High Resolution and Ultra High Resolution Sea Surface Temperature Analysis
SST_MED_SST_L4_NRT_OBSERVATIONS_010_004

✓ Mediterranean Sea- In-Situ Near Real Time Observations
NSITU_MED_NRT_OBSERVATIONS_013_035

✓ MEDITERRANEAN SEA GRIDDED L4 SEA SURFACE HEIGHTS AND DERIVED VARIABLES NRT
SEALEVEL_MED_PHY_L4_NRT_OBSERVATIONS_008_050

COASTAL CRETE
context and description

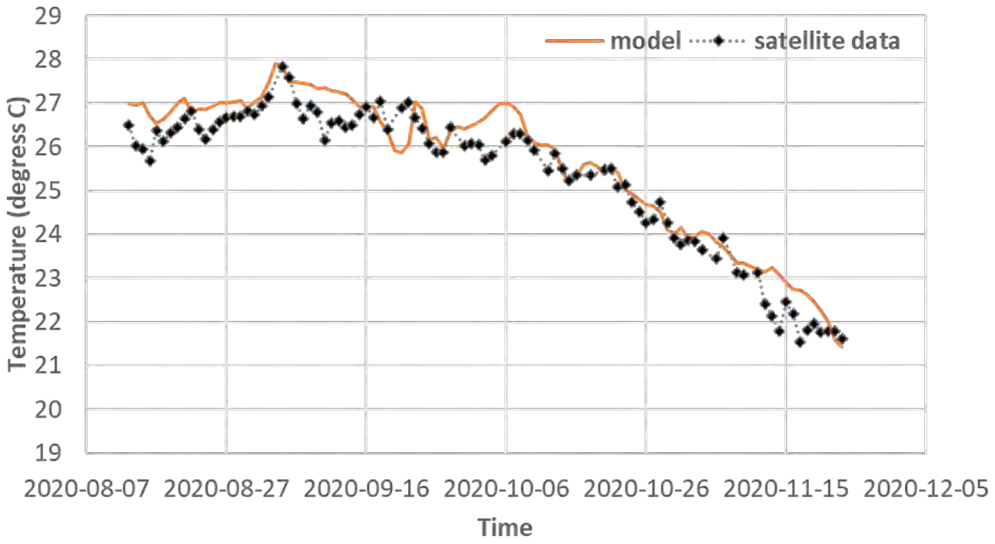
Calibration and validation of COASTAL CRETE hydrodynamic model

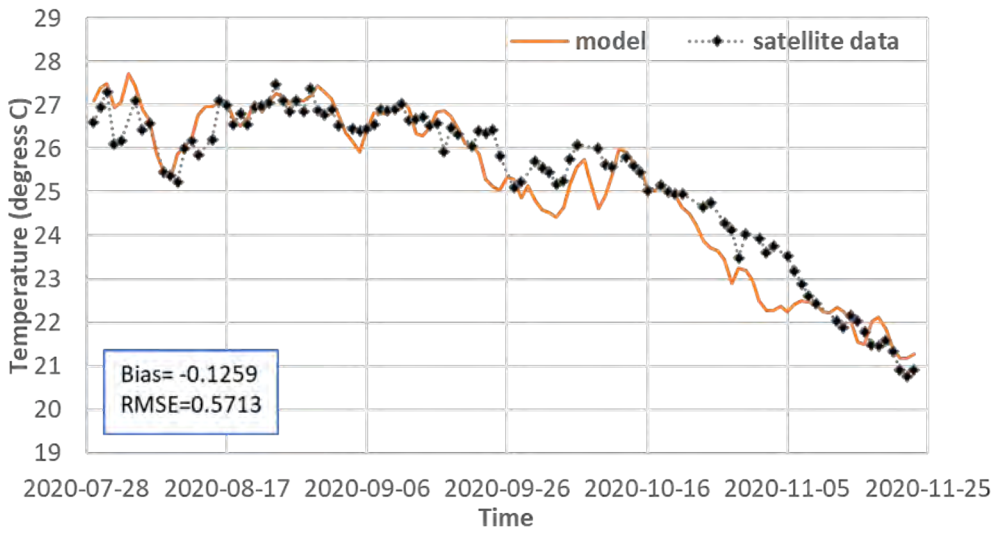


evaluation of the Crete coastal hydrodynamical model based on the comparison of the produced temperature, salinity and sea current values against the hourly produced CMEMS Med MFC data

COASTAL CRETE
context and description

Calibration and validation of COASTAL CRETE hydrodynamic model

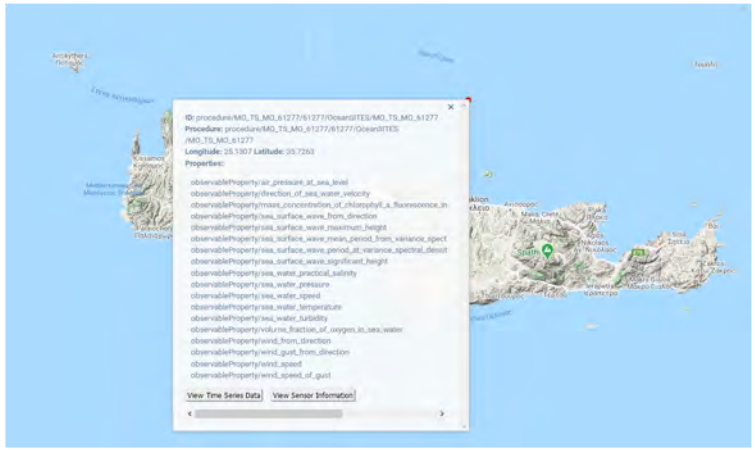


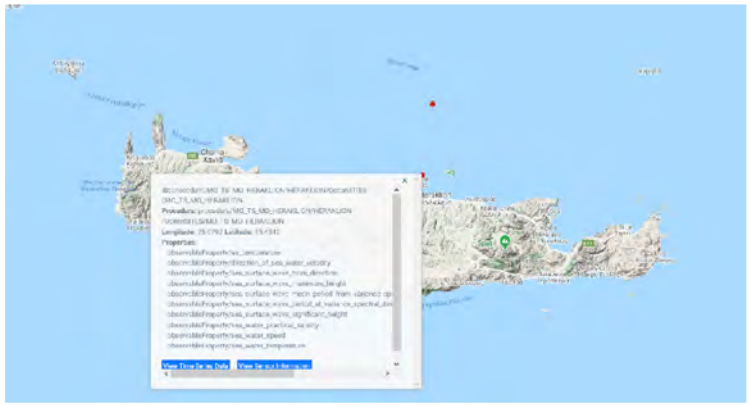


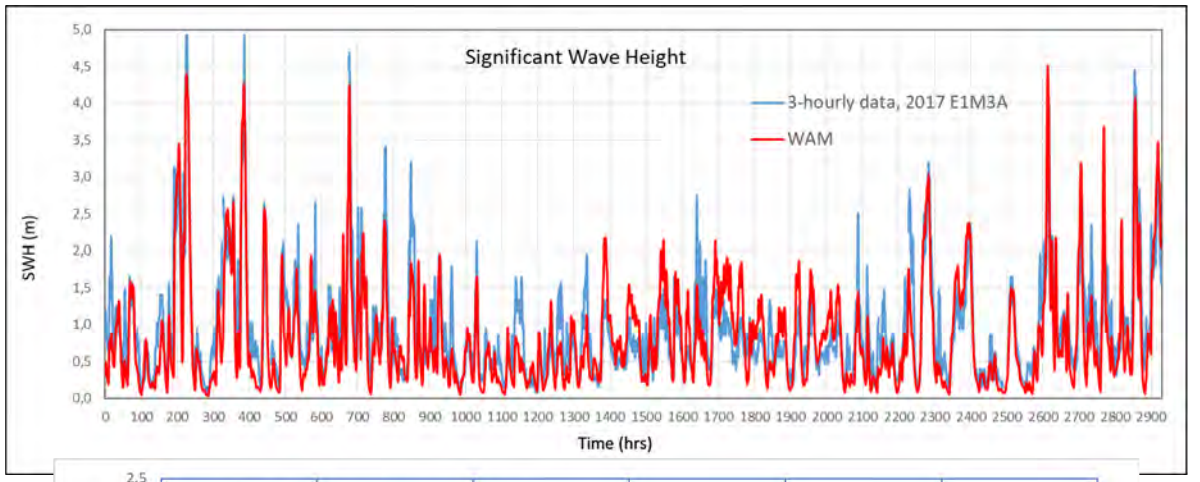
Inter-comparison of COASTAL CRETE model (red line) with satellite SST observations (black dots), for 2 selected points (1st point long. 25.95°, lat 34.68°, 2nd point 23.73°, lat. 35.11°) at the south of COASTAL CRETE domain for a period of 3 months from 13/8/2020 to 23/11/2020.

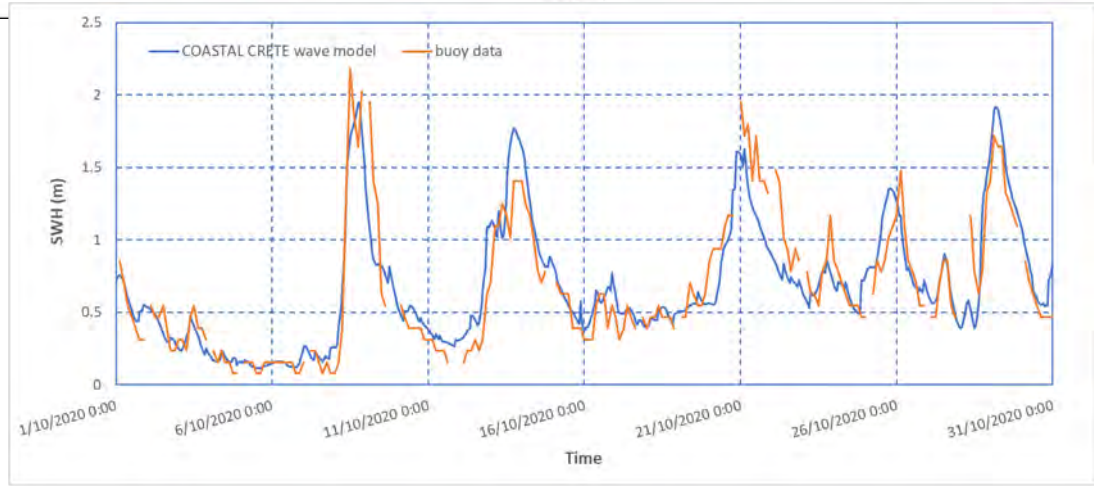
COASTAL CRETE
context and description

Calibration and validation of COASTAL CRETE wave mode

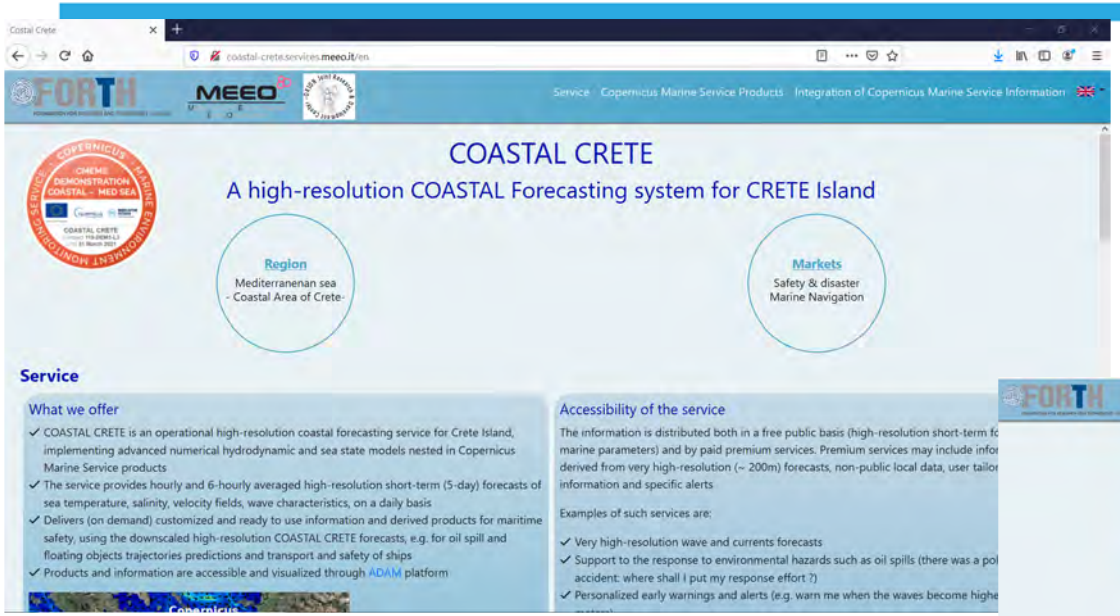




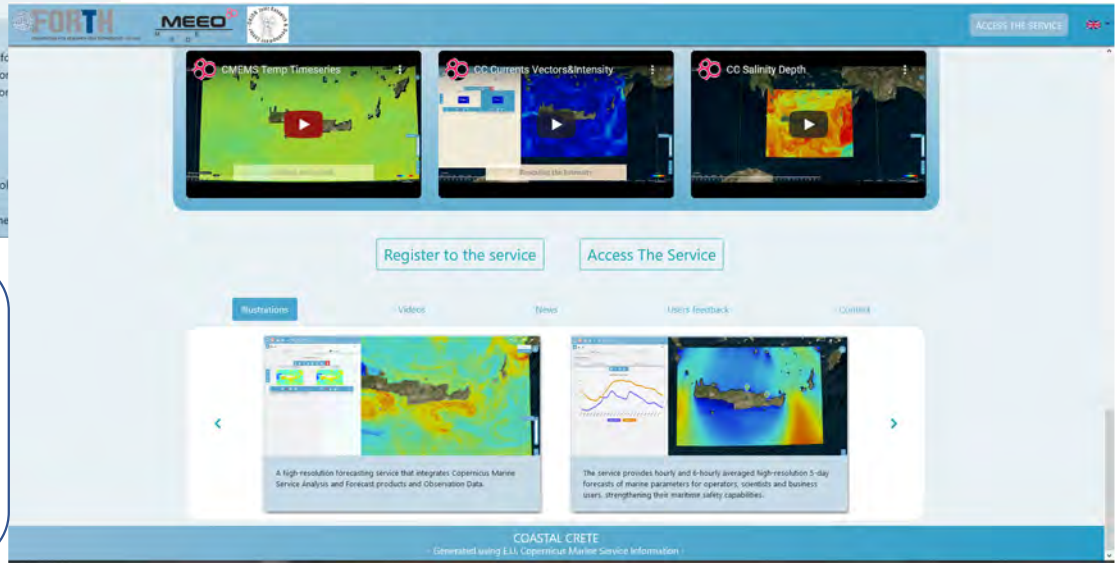




COASTAL CRETE
SERVICES



ADAM provides automatic data exchange management capabilities between the CMEMS Med MFC and the COASTAL CRETE models, enabling data visualization, combination, processing and download through the implementation of the Digital Earth concept.



CMEMS Med MFC products and the abovementioned COASTAL CRETE forecasts are made available through a customized instance of ADAM (Advanced geospatial Data Management platform) developed by MEEO S.r.l.
https://explorer-coastal-crete.adamplatform.eu/

COASTAL CRETE
SERVICES

Thank you !

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