UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Ocean Monitoring and Data Analysis

2425-2-F7502Q042

Aims

Provide information on available oceanographic databases and how their data are gathered and stored. Provide background information on the contribution of remote sensing to ocean and coastal water monitoring. Show how data can be visualised and analysed to answer to specific questions, using statistical methods and models, with Matlab and/or Python software.

Contents

Ocean observing systems, including remote sensing, Eulerian stations, drifters and ship measurements. Ocean databases. Spatio-temporal data analysis. Modeling tools. Visualisation tools.

Detailed program

Data retrieved from satellites: sea surface temperature, sea surface salinity, sea surface height, surface wind speed, significant wave height, ocean color.

ARGO floats: subsurface measurements. Moorings and buoys. High Frequency coastal radar network. Reanalysis.

Seasonal variations, removal of seasonal cycle, data detrending and filtering.

Correlation and covariance. Composites.

Statistical significance.

Netcdf data format. TEOS-10 software for seawater properties.

Examples of practical data analysis:

Geostrophic currents from hydrographic measurements and from sea surface height.

Tropical cyclone tracks and cold wakes.

Coral bleaching heat stress monitoring: Degree Heating Weeks and coral hotspots.

Prerequisites

Physics of the Sea

Teaching form

a) 2 two-hour lectures and 1 three-hour lecture, in presence, Delivered Didactics

b) 15 four-hour computer lab activities, in person, Interactive Teaching

Textbook and teaching resource

Mathworks tutorials: MATLAB Fundamentals, MATLAB Programming Techniques, MATLAB for Data processing and visualisation (available online).

Slides, booklet, and scripts from the instructors.

Semester

First

Assessment method

- Written examination: short report on an individual ocean data analysis project (6 pages upper limit)

- Oral examination: discussion of topics covered during class and of the individual data analysis project

Office hours

Contact the instructor

Sustainable Development Goals

QUALITY EDUCATION