First South African CROCO Summer School
Advanced Courses 24/10 – 28/10 2022

Motivation of the courses:

The course will be composed of a suite of lectures and hands-on sessions. As detailed below, several advanced features of CROCO will be presented. Particular attention will be given to practicals and immediate application of the classes during hands-on sessions. The attendees will apply the morning class during the afternoon hands-on sessions.

The class will take place in the CHPC (in Rosebank, close to UCT) and will make use of their server. The models will already be installed on the server. A maximum number of 20 in person participants and 20 virtual will be selected. At the end of the class, students are invited to copy their outputs and codes on their personal portable hard drives. Please note that lunch will not be provided during the class.

Target audience and prerequisites:

This course is designed for researchers, students, working professionals and/or interested in the use and features of numerical models of the ocean. A knowledge of physical oceanography and numerical modeling (preferably CROCO, but also WRF, PISCES, WW3), and experience working with computer programming with Matlab/Octave, optionally Python, and knowledge of the Linux operating system is required.

For inscription, please fill the following form before July 15th:
https://forms.gle/U7AN9dWUvrEmKAhL9

Instructors (in-person) and expertise:
Jennifer Veitch (SAEON), CROCO
Christian Ethé and Renaud Person (LOCEAN, IRD/CNRS, France), Physical Biogeochemical Coupling
Rachid Benshila and Guillaume Morvan (LEGOS, IRD/CNRS, France), Physical-Sediments Coupling
Fabien Desbiolles (University of Milan, Italy), Air-Sea Coupling
Lionel Renault (LEGOS, IRD, France), Air-Sea Coupling

Instructors (remote) and expertise:
Olivier Aumont (LOCEAN, IRD, France), Physical Biogeochemical Coupling
Vincent Echevin (LOCEAN, IRD, France), Physical Biogeochemical Coupling
Odette Vergara (Universidad de Concepcion), Physical Biogeochemical Coupling
Gildas Cambon (LOPS, IRD, France) Air-Sea Coupling
Patrick Marchesiello (LEGOS, IRD, France), Non-hydrostatic
Laurent Roblou (LAERO, CNRS, France), Non-hydrostatic
Andres Sepulveda (Universidad de Concepcion, Chile), Non-hydrostatic

Here is the schedule planned. It will be subject to changes according to the progression of the hands-on lab sessions. **Each day starts at 9:30AM and ends at 5:00 PM (with a break for lunch of 1.30h).**

Day 1 -2 – October 24-25rd: Biogeochemistry
Morning First day:

- Modeling of Biogeochemistry: O. Aumont (remote), with help of Christian Ethé and Renaud Person (in-person) [45mn + 15mn questions]
- CROCO-PISCES Applications: V. Echevin (remote), with help of Christian Ethé and Renaud Person (in-person) [45mn + 15mn questions]

- CROCO-PISCES Applications: O. Vergara (remote), with help of Christian Ethé and Renaud Person (in-person) [45mn + 15mn questions]

Hands-on session: **start at 2PM the first day**

- TP CROCO-PISCES (1.5 day): installation of the Benguela configuration (Low Resolution), sensitivity tests: Christian Ethé, Renaud Person and other lecturers (in-person)

Day 3 – October 26rd: Sediments

Morning:

- Sediments Modeling with CROCO: Rachid Benshila (in person) [45mn + 10mn question]
- Sediments Modeling with CROCO II: Rachid Benshila (in person) [45mn + 10mn question]
- Presentation of Test Cases: Guillaume Morvan (in person) [45mn + 10mn question]

Afternoon: hands-on session with Idealized Cases: Guillaume Morvan, Rachid Benshila, and other lecturers.

Day 4 – October 27rd: Air-Sea Interactions

Morning:

- Ocean-Atmosphere mesoscale coupling: why does it matter? Fabien Desbiolles (in person) [45mn + 5mn question]
- Introduction to WRF. Fabien Desbiolles (in person) [35mn + 5mn question]
- OASIS and Coupling in CROCO. Lionel Renault [20mn + 5mn question]

Afternoon: hands-on session

- Coupling with a Toy. Gildas Cambon (remote) with help of other lecturers
- Ocean-Atmosphere Coupling: the case of the Benguela Upwelling System (F. Desbiolles with helps of other lecturers)

Day 5 – October 27rd: Non-Hydrostatic

Morning:

- Advances in non-hydrostatic. Patrick Marchesiello [2 x 45mn]
- Dynamics of the strait of Gibraltar. Laurent Roblou [45m]

Afternoon: hands-on session on Idealized cases. Andres Sepulveda with helps of other lecturers