

# **HPC and natural hazards: modelling tsunamis and volcanic plumes using European flagship codes @ BSC**

**Monday 02 December 2019 - Thursday 05 December 2019**

**Barcelona BSC Campus Nord**

## **Agenda**

### Day 1

Session 1 / 10:00am – 1:30pm (3 h lectures)

10:00-11:30 Volcanic clouds and plumes: Introduction to the physical problem

11:30-11:50 Coffee break

11:50-13:30 Introduction FALL3D

13:30-14:30 Lunch break

Session 2 / 2:30pm – 6:00 pm (1:30 h lectures, 2 h practical)

14:30-16:00 Introduction to ASHEE

16:00-16:20 Coffee break

16:20-18:00 Installation and compilation of FALL3D and ASHEE

### Day 2

Session 1 / 10:00am – 1:30pm (3 h hands-on)

10:00-11:30 FALL3D hands on I

11:30-11:50 Coffee break

11:50-13:30 FALL3D hands on II

13:30-14:30 Lunch break

Session 2 / 2:30pm – 6:00 pm (1:30 h lectures, 2 h practical)

14:30-16:00 ASHEE hands on I

16:00-16:20 Coffee break

16:20-18:00 ASHEE hands on II

### Day 3

Session 1 / 10:00am – 1:30pm (1:30 h lectures, 1:40 h practical)

10:00-11:30 Introduction to tsunami modeling and the Tsunami-HySEA code

11:30-11:50 Coffee break

11:50-13:30 Tsunami-HySEA: from simple to complex simulations

13:30-14:30 Lunch break

Session 2 / 2:30pm – 6:00 pm (3 h hands-on)

14:30-16:00 Tsunami-HySEA hands on I

16:00-16:20 Coffee break

16:20-18:00 Tsunami-HySEA hands on II

### Day 4

Session 1 / 10:00am – 1:30pm (3 h lectures)

10:00-11:30 A brief introduction to the Python language and object oriented programming

11:30-11:50 Coffee break

11:50-13:30 Scientific computing tools and reading files and accessing remote data

13:30-14:30 Lunch break

A brief introduction to the Python language

-Installing packages

Object oriented programming

-Examples on classes and motivation

-How to make a class

-Method Objects

-Example: manipulating dates and times

### Scientific computing tools

- Vectors and arrays: basic operations and manipulations
  - References and copies of arrays
  - Vectorization
  - Statistics tools
  - Data Analysis with Pandas
- Reading files and accessing remote data
- Read and write multi-column data files
  - File formats used in geosciences netCDF, HDF5, HDF-EOS 2, and GRIB 1 and 2
  - Data Access Services: OPeNDAP, NetCDF Subset Service, etc...
  - Example: Reading data from OpenDAP

### Session 2 / 2:30pm – 6:00 pm (3h hands-on)

14:30-16:00 Visualization

16:00-16:20 Coffee break

16:20-18:00 Examples and exercises

#### Visualization

- Simple line plots
- Adjusting the plot
- Visualization of geographic data
- 3D Scientific data visualization

#### Examples and exercises

- FALL3D pre and post-processing tools

END of COURSE