1. Research activity (max 1.000 words)

The aim of my research activity is the development of numerical models which simulate subduction zones dynamics and its relation with mantle circulation, using 2D and 3D, plane and spherical models. Although several authors investigated subduction zones dynamics and mantle circulation through numerical modelling tools (e.g., Gerya et al., 2008; Tackley, 2000; Steinberger et al., 2012; Becker, 2017, etc.). The starting point for my research was the lack of literature including three of the main kinematic and geophysical constraints for subduction dynamics:

1) a global westward drift of the lithosphere, which generates an eastward motion of the mantle below.

2) the subduction hinge motion, that allows estimation of the effective velocity with which the lithosphere enters within the mantle.

3) a Low Velocity Zone

During my PhD I firstly worked on 2D numerical models on a plane geometry, with the objective of studying the interaction between a horizontal mantle circulation and the dip of a subducting slab, having the same or opposite direction with respect to it. In the last part of my PhD I made a global kinematic analysis and an estimation of the lithospheric volumes currently subducting worldwide. Data obtained from these analysis were used as input for a 2D numerical model (both in plane and spherical geometries) to investigate the global mantle circulation pattern under the influence of plate tectonics.

2. Research products

a) Published paper:

b) Manuscripts (submitted, in press):

Ficini, E., Cuffaro, M., Doglioni, C. Asymmetric mantle convection: clues from lithosphere sinking at subduction zones.

c) Abstracts:


- Workshop “Crust to Core” - *oral presentation*, Omishima Island, Japan.