



**HAL**  
open science

## **Eocene to Oligocene upper plate tectonic response to Apennine subduction**

Gianluca Frasca, Mary Ford, Julien Léger, Paul Blazquez, Jaume Vergés, Luca Costamagna, Florence Quesnel, Adrien Romagny

► **To cite this version:**

Gianluca Frasca, Mary Ford, Julien Léger, Paul Blazquez, Jaume Vergés, et al.. Eocene to Oligocene upper plate tectonic response to Apennine subduction. 20th EGU General Assembly, Apr 2018, Vienne, Austria. pp.3955. hal-03552842

**HAL Id: hal-03552842**

**<https://hal.science/hal-03552842>**

Submitted on 2 Feb 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



## **Eocene to Oligocene upper plate tectonic response to Apennine subduction**

Gianluca Frasca (1), Mary Ford (1), Julien Léger (1), Paul Blazquez (1), Jaume Vergés (2), Luca Costamagna (3), Florence Quesnel (4), and Adrien Romagny (5)

(1) CNRS, CRPG Nancy, Nancy, France, (2) Institute of Earth Sciences Jaume Almera, ICTJA-CSIC, Lluís Sole i Sabarís s/n, 08028 Barcelona, Spain, (3) Dipartimento di Scienze della Terra, Università di Cagliari, Via Trentino 51, 09127 Cagliari, Italy, (4) BRGM, 3 Avenue Claude Guillemin, 45100 Orléans, France, (5) Université d'Orléans, ISTO/OSUC, UMR 7327, 45071 Orléans, France

Phases and patterns of uplift and subsidence characterise the tectonic evolution over subduction zones at the Myr time scale. The dynamics of the subducting plate influences upper plate deformation at crustal level. Crustal deformation, in turn, causes vertical motion through isostatic response of thinned or thickened crust. Consequently, the influence of mantle-driven processes needs to be discriminated from the influence of more local isostatic adjustment.

In this work we investigate the upper plate tectonic response to changing subduction dynamics in the western Mediterranean from Mid Eocene to end Oligocene. The surface effects of the push-to-pull mode switch of the subduction system are shown on palinspastically restored paleogeographic maps. Regional distribution of uplift and subsidence and compression-extension at the Apennine-Alps-Pyrenees intersection are integrated in a plate kinematic framework using the free software GPlates. A new restoration at crustal scale of the Corsica-Sardinian block from Eocene to present is proposed using published geophysical and geological data, onshore and offshore. The main result is that the Corsica-Sardinia block needs to be divided in three blocks to restore the crustal thickness to 30 km at 35 Ma. The position of these blocks during the Pyrenean orogeny is then clarified. New structural and stratigraphic data from Sardinia, coupled with available thermochronological data from basement and Tertiary sediments are in agreement with this restoration and shed light on the Eocene to Oligocene poorly constrained period for Sardinia. The rheological role of Triassic layers during compression and extension, the onset of the Pyrenean foreland subsidence at Lower Eocene and the Late Eocene-Oligocene stratigraphic response to the onset of back-arc extension are elucidated with field data.

This study is part of the "Orogen" research program funded by Total, BRGM (Bureau de Recherches Géologiques et Minières), and CNRS (Centre National de la Recherche Scientifique).