Geophysical Research Abstracts
Vol. 18, EGU2016-11704, 2016
EGU General Assembly 2016

Quantification of low elevation relief vertical movements from global sea level curves and scattered marine deposits (Armorican Massif, France)

Paul Bessin (1), François Guillocheau (2), Cécile Robin (2), Hugues Bauer (3), and Jean-Michel Schroëtter (4)

(1) Département de Géosciences, Université du Maine, Avenue Olivier Messiaen, 72085 Le Mans cedex 09 (paul.bessin@univ-lemans.fr), (2) Géosciences Rennes, UMR 6118, OSUR, Université Rennes 1-CNRS, 35042 Rennes cedex , (3) BRGM, 3 avenue Claude Guillemin, BP 36009, 45060, Orléans cedex, (4) BRGM, DR Bretagne, 2 rue de Jouanet, 35700, Rennes

Amplitudes of vertical movements, amount of burial or of denudation are often too low or too old to be quantified from thermochronological or cosmogenic isotopes methods. This is the case for the vertical movements experienced by European Variscan basements of low relief during Cenozoic times. Some of these basements bear scattered thin Cenozoic marine sediments. Thus, we proposed to quantify Cenozoic vertical movements from i) current elevation of well dated marine sediments scattered on these basements, corrected from their bathymetry of deposition provided by their sedimentary facies and ii) elevation of global sea level at time of sediment deposition from a new compilation of available curves. This compilation highlights that i) curve which takes into account ocean basin volume change are consistent for the ca. 100 to 40 Ma "greenhouse" period whereas ii) curves based on coreholes backstripping methods better reflect global sea level changes since ca. 40 Ma. For their respective time intervals, both are in accordance with curves which together take into account ocean water volume and ocean basin volume changes.

We quantify Cenozoic vertical movements of the Armorican Massif showcase. This massif is French Variscan basement of low relief (elevation < 420 m), two times buried then exhumed during Jurassic to Paleocene times, which bears numerous Cenozoic remnants of marine sediments of four periods: Bartonian, Rupelian, Langhian-Serravalian and Piacezian-Gelasian. We evidence a tree-step history of Cenozoic vertical movements and deformation:

i) 38-34 Ma: a phase of near stability of the massif related to no to low deformation period for the Western Europe;

ii) 30-16 Ma: a phase of low subsidence which coeval to a long wavelength subsidence of Western Europe which is proposed to be mantle-driven (dynamic topography);

iii) 3.5-0 Ma: an overall bulging phase of the massif related to Apulia-Eurasia convergences due to Africa-Apulia and Iberia plates convergence which initiate the incision of present-day drainage system as evidence by previous studies.