UNIVERSITA' DEGLI STUDI DI PADOVA
DIPARTIMENTO DI GEOSCIENZE
Via Gradenigo 6
35131 Padova
www.geoscienze.unipd.it

DIPARTIMENTO DI GEOSCIENZE

Seminar "ARDUINO LECTURE"

Asymmetric Plume Flow During South Atlantic Rifting: Causes and Consequences

Giovedì, 6 dicembre 2018 – ore 16:30
Aula Arduino

Relatore: **Jason Phipps Morgan**
Royal Holloway University of London

Abstract:
During rifting along a plume-influenced continental margin, excess volcanism is defined by the transition from rifting to spreading being associated with much thicker than normal oceanic crust and pervasive Seaward Dipping Reflectors (SDRs) that are now straightforward to image with modern deep seismic reflection techniques. The current conventional model is that the excess volcanism should be associated with the region of influence of a plume head, roughly centered about the starting plume tail's location below its quasi-spherical rising plume head.
However, unlike the North Atlantic where this spatial pattern crudely holds, with the Iceland plume track located within the region of initial excess volcanism and SDRs associated with Greenland-European rifting, the geometry of South Atlantic rift-related excess volcanism does not appear to fit this pattern. The South Atlantic, instead, has the Tristan plume track located near or at the northern limit of the region of excess magmatism defined by the extent of SDRs along this margin.
Here we investigate a different plume-linked hypothesis for the formation of excess volcanism during early plume-influenced continental rifting, in which lateral plume drainage has the potential to be shaped by both lateral thickness variations in the thickness of continental lithosphere and along-strike variations in the geometry and opening rate of the rift. Using new 3-D mantle flow calculation, the plume material is predicted to be pulled southward from the Tristan plume as the rift develops, irrespective of whether the initial Tristan plume lay beneath the present-day African or South American continental lithosphere. Isostatic compensation of plume material ponding beneath the growing region of extending, thinning, continental lithosphere creates the elevated regional relief above the region where SDRs form - no plume head is needed to explain the source of this excess transient topographic anomaly.

Jason Phipps Morgan *is professor of Geophysics at the Royal Holloway University of London. He spent almost a decade at the Cornell University and before worked at the Scripps Institution of Oceanography in San Diego and also served as Director of Geodynamics Division at GEOMAR Research Center in Kiel. His scientific achievements have been recognized through numerous awards, including the James B. Malcelwane Award of the American Geophysical Union and the A.E.H. Love Award of the European Union of Geosciences.*

Proponente: Christine Meyzen