AMPHIBIOUS MT EXPERIMENT ON COSTA RICAN SUBDUCTION ZONE TO INVESTIGATE DEEP ELECTRICAL RESISTIVITY STRUCTURE

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The water content and its distribution play an important role in the subduction process. Water is released from the subducting slab in a series of metamorphic reactions and the hydration of the mantle wedge may trigger the onset of melting, weakening and changes in the dynamics and thermal structure of subduction zones. However, the amount of water carried into the subduction zone and its distribution are not well constrained by existing data and are subject of vigorous current research in SFB574 (Volatiles and Fluids in Subduction Zones: Climate Feedback and Trigger Mechanisms for Natural Disasters).
We will show numerical modeling studies which are used to determine the resolution and sensitivity of the MT response to fluids in the crust and subducting slab under the special condition of a coastal setting.
In 2007-2008 we conducted a long-period magnetotelluric investigation in northwestern Costa Rica on- and offshore, where the Cocos Plate subducts beneath the Caribean plate.
Eleven marine magnetotelluric stations newly developed and constructed by IFM-GEOMAR and University of Kiel were deployed on the 200 km long marine extension of the profile for several months.
We will present the data and its processing, as well as our attempts to eliminate motion induced noise observed on some stations on the cliffy shelf due to tidal waves hitting the shelf and trench parallel- and perpendicular currents. The marine profile was extended landwards by the Free University of Berlin over length of 160 kilometers with further 18 stations.
We present preliminary inversion results of the combined on- and offshore data stets indicating hydration of the downgoing oceanic plate, fluid release from the forearc and rise of partial melt underneath the volcanic arc.

subduction zone, marine MT, tectonics