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ABSTRACT BOOK

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structures.

The final sections reveal the crustal structures down to the Moho with an upper and a lower plate separated by an intra-plate detachment surface at a depth of 10 to 15 km. The stack of the thrust nappes of the External Hellenides is imaged in the upper plate, while the Ionian crust and Moho present a thickness of about 9-10 km, gently dipping from North to South and from the Ionian Sea (around 20 km depth) toward the Peloponnesus coasts where the base of the Ionian cold and brittle crust quickly reaches about 35 km depth at the collision with the Hellenic crust.

T/SD1/MO/O3 **- THE PELOPONNESUS CONTINENTAL MARGIN FROM THE ISLAND OF ZAKYNTHOS TO PYLOS. PART 1: MORPHOLOGY AND RECENT SEDIMENTARY PROCESSES**

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The Western Peloponnesus is an area repeatedly affected by large magnitude earthquakes occurring offshore and onshore mainly as consequences of the convergence and ongoing collision between the Western, previously strongly deformed, continental border of the Aegean sub-plate and the deep Ionian Sea and Apulia domains; the last significant event (magnitude 6.4) has occurred near Patras in June 2008. Among the objectives of the Sixth Framework Program of the European Commision project SeaHellArc (SEismic and tsunami risk Assessment and mitigation scenarios in the western HELLenic ARC) was to provide a detailed submarine morphological-geological background of this area of the Western Peloponnesus continental margin. The objective was to confirm that *(1)* the majority of earthquakes proceed from ruptures occurring beneath the continental slope, *(2)* their cumulated effects have generated, through geological time, specific tectonic features which affect the basement and its sedimentary cover and can be identified, mapped and tentatively dated, and *(3)* by shaking the most recent and unconsolidated sedimentary blanket, earthquakes may be generated along the continental slope where large scale submarine failures themselves are able to trigger tsunamis. To better define and evaluate the seabed morphology a detailed mapping of the bathymetric characteristics of an area of approximately 12.000 Km^2 (200 Km by 60 Km) has been performed in the Spring 2007 onboard the OGS R/V "Explora" using multibeam sonar swath mapping techniques. In addition to swath bathymetry the shallow structure, up to 100m penetration, of the recent sedimentary cover was imaged using a high-resolution sub-bottom CHIRP system. These data have been used, concurrently with the detailed morphological maps, to better assess the various active geological processes, particularly slope by-passing and failures, debris flows, and faulting that are driven by the earthquake/tectonic activity which characterises the area and are imprinted on the sea floor. Integrating the detailed morpho-bathymetric and chirp data allowed four different and contrasting domains to be identified on this segment of the active continental margin. The effects of recent and significant tectonic activity is clearly illustrated by the intense overall fracturing and the presence of deep, elongated, tilted and deformed bordering slope basins. An unexpected result has been the identification of significant large-scale marine failures and sedimentary destabilisation. In the recent (Holocene?) past major submarine failures have already occurred in the area and have probably triggered significant local tsunamis.

T/SD1/MO/O4 **- HIGH-RESOLUTION APPROACH TO THE TOP OF THE AFRICAN SLAB UNDER EASTERN PELOPONNESUS: ITS NATURE AND DEPTH FROM TELESEISMIC RECEIVER-FUNCTIONS ALONG A TIGHT ARRAY**

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In the frame of the European "Thales was right" project, several 3-component seismological stations have been deployed in Greece along the Eastern coast of Peloponnesus. The recorded data lead to new insights both on the nature of the slab, from tight constraints obtained on the nature of its crust, as well as on the geometry of the slab top under Peloponnesus to more than 60 km depth.

Teleseismic P receiver-functions (RF) have been computed for a set of stations. These RF clearly show two P-to-S converted waves: a trough followed in the newt two seconds by a peak corresponding respectively to the conversion at the top and bottom of a Low Velocity Layer (LVL) at the top of the Hellenic slab.

By analyzing the variation of polarities and arrival times of these converted waves function of the azimuth and distance of the teleseismic events, the slab dip direction and dip value have been constrained to be about N30°E and 16° under Eastern Peloponnesus. This multi-azimuthal study permits characterizing the depth and the geometry of the Hellenic slab for the first time and gives results consistent with the plate convergence direction.

In a second step, we focus on the nature of the LVL at the slab top. In order to identify if it is of continental or oceanic nature, we develop a new wavelet approach for the case of the teleseismic P-to-S converted waves. We first quantify the domain of interaction between the signal wavelength and the bed thickness. This leads us to conclude that a signal period shorter than about 1 s is necessary to characterize a LVL such as an oceanic crust. Indeed, for commonly used filters, the estimated thickness will be twice the true thickness. Having established the need for shorter periods, we apply our methodology for a very high frequency earthquake. We then show that the crust now subducting beneath Eastern Peloponnesus is of oceanic kind. This result is consistent with the fast trench retreat and South West advance of the Aegean upper plate domain over the oceanic slab of the Ionian sea basin underlying now Eastern Peloponnesus.

T/SD1/MO/O5 **- ACTIVE DEFORMATION IN THE BROADER AREA OF THE W. CORINTH GULF (GREECE)**

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The rapidly opening rift of the Corinth Gulf is dominated by normal faults and high level of seismicity. Recently, an important number of moderate earthquakes occurred in the western part of the gulf and the surrounding region. In April 2007, 4 events with magnitudes 5.0-5.2 occurred near Trichonis Lake, in SE Aitoloakarnania. A temporary network of 12 stations was installed for 3 months. Several thousands of aftershocks were recorded and about 1200 were located with high precision. The seismicity pattern showed activation of several main and minor faults surrounding the lake. Reliable focal mechanisms indicated a complex pattern of deformation including mainly normal and strike-slip faulting. In February 2008, two earthquakes of Mw=4.6 and 4.5 occurred SE of Patras. Both the distribution of aftershocks and the focal mechanisms of the main events exhibit sinistral strike-slip faulting in N-S direction, in contradiction with the prevailing N-S extension pattern in the area. It is worth mentioning that the polarization analysis employed, revealed a decrease of the time delay values between the two split shear waves after the occurrence of the first main event, implying variation of the medium properties. On 8 June 2008, a large earthquake (Mw=6.4) occurred NE of Andravida. The focal mechanisms of the mainshock and selected aftershocks provided by body wave modeling showed strike-slip faulting. The spatial distribution of the aftershocks, as well as the calculation of the slip distribution indicated dextral strike-slip faulting in NE-SW direction. Static Coulomb stress changes were computed using the produced slip model to investigate possible stress transfer to a neighboring area and the observed large dimensions of the deforming area. The most recent seismic activity was in January 2010 near Efpalio, with the occurrence of two earthquakes (Mw=5.1). Computed focal mechanisms indicated normal faulting in an almost E-W direction, also evident by the aftershock distribution. More than 2000 aftershocks were located with sufficient accuracy and relocated using a master event method. Relocation procedure revealed a complex deformation pattern comprising of at least 5 distinct aftershock clusters. The detailed analysis of the above mentioned recent seismic sequences reveals that the central part of the Corinth gulf is dominated by normal faults striking E-W, while the area to the NW of the gulf by a combination of E-W normal and NNW-SSE sinistral strike-slip faults. The SW area of the Corinth rift is characterized by dextral strike-slip faults striking SSW-NNE.

T/SD1/MO/O6 **- THE MW 6.3 MOVRI MOUNTAIN EARTHQUAKE, JUNE 8, 2008, GREECE**