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HR: 0800h
AN: **T31A-08**
TI: Multi-Stage Extension And The Mid-Late Miocene Arc-Parallel Extension Event In The Hellenic Ridge
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AB: A dominant localized arc-parallel extension interrupting a regional arc-normal extension accompanied the exhumation of HP-rocks in the southwestern segment of the Hellenic forearc ridge. Along the Cretan- Peloponnese segment, the youngest ZFT cooling ages from the HP-rocks below the PQU-PLK detachment show a consistent correlation with areas of development of arc-parallel (NW-SE) extension lineation. In these areas the samples give ZFT ages of 9.2-10.2 Ma in the southeastern Peloponnese, 9.1-10.4 Ma ages in Kythera, and 13.4-14.6 Ma ages in western Crete. The arc-parallel lineation becomes less prominent and is replaced by an arc-normal lineation farther to the northwest in the Peloponnese, and in western Crete along- arc lineations occur in a few places but are not strongly developed, and the stretching lineation in this area is mostly oblique to or normal to the arc. Zircons giving older ZFT ages occur in samples from areas showing arc-normal stretching lineation. The arc-parallel extension occurred under ductile to ductile-brittle transition conditions. There is also evidence of an older arc-normal extension which occurred entirely under ductile conditions, and the younger arc-parallel structures overprint these earlier ductile structures. ZFT ages plotted versus the associated stretching lineation orientations from the same localities shows that the prominent change of the forearc ridge extension direction occurred between 13-12 Ma in the Peleponnese and Kythera. The earlier ductile structures near the detachment fault mostly show top-to-NE shear displacement in the PQU and PLK units along the southern- Peloponnese-western-Crete ridge. Later ductile to ductile/brittle structures in the southeastern-Peloponnese- Kythera ridge segment show mostly top-SE (arc-parallel) displacement; in westernmost Crete, top-NW (these structures have an arc-parallel component) and top-N occur. The structural record of the PQU exhumation thus shows an earlier ductile detachment of NE-SW extension in the Kythera-Peloponnese area. This same event in Crete is oriented close to a N-S direction because of the arc curvature. Near the end of this ductile extension as the PQU approached the ductile-brittle transition the change to NW-SE orientation of extension on the detachment overprinted the early structures along part of the Peloponnese-Cretan ridge in the Kythera Strait- southeastern Peloponnese. Brittle structures, including significant normal faults that define large-scale features in the inland and submarine topography, cut rocks both above and below the PQU-PLK detachment. Along the Peloponnese- Cretan ridge, these are the controlling structures defining this structural high, and are integral to the development of the present forearc ridge. These latest structures, formed by arc-normal extension, overprint the previous ductile and ductile-brittle structures. We suggest the transition back from arc-parallel to arc- normal extension probably occurred about 11-9 Ma. ago. The young exhumation of the Kythera-SE Peloponnese PQU marks an episode of localized strong stretching of the Hellenic Arc over the subducting oceanic remnant of the African plate; our exhumation ages from the western part restrict this to

between about 14 and 9 Ma ago. Increased slab rollback would effectively drive significant expansion and extension in the Aegean forearc. In a larger context, arc-parallel extension is prominent following the Mid Cycladic Lineament from the forearc near Kythera into the backarc (Paros, Ios, Sifnos), also reflecting the expansion and opposite rotations of the western and eastern parts of the Aegean and the Hellenic arc.
DE: 1140 Thermochronology
DE: 8000 STRUCTURAL GEOLOGY
DE: 8109 Continental tectonics: extensional (0905)
SC: Tectonophysics [T]
MN: 2009 Joint Assembly

Session Information

Tectonophysics

2009 Joint Assembly

Wednesday Morning 1			
Time	**Session**	**Location**	**Title**
0800	**T31A**	**CC Hall E**	**Tectonophysics General Contributions I Posters** ***Presiding: J Lowman, University of Toronto; S Butler, University of Saskatchewan*** *Print-friendly session details*
0800	T31A-01	CC Hall E	Earthquake (1935 Timiskaming M6.2) Triggered Slumps in Lake Kipawa, Western Quebec Seismic Zone, Canada *L Daurio, M Doughty, N Eyles POSTER Abstract
0800	T31A-02	CC Hall E	Analogue Modelling of Evaporite Diapirs on Ellef Ringnes Island, Canadian Arctic Archipelago: First Results *J Macauley, A Cruden, T Brent, R Stephenson POSTER Abstract
0800	T31A-03	CC Hall E	The High Obliquity Paradigm *A Sanchez, L Sanchez Bettucci POSTER Abstract
0800	T31A-04	CC Hall E	Retrodeformation Anaysis of Quaternary Fault in the Southeastern Part of Korean Peninsula *S Choi, U Chwae POSTER Abstract
0800	T31A-05	CC Hall E	Active Neotectonic Structures in Glacial and Postglacial Sediment in Lake Timiskaming, Timiskaming Graben, Ontario/Quebec Canada M Doughty, *N Eyles, C Eyles POSTER Abstract
0800	T31A-06	CC Hall E	La Tuna Complex: A possible Neoproterozoic ophiolite *E Peel, M Basei, L Sanchez Bettucci POSTER Abstract
0800	T31A-07	CC Hall E	Friction Rheology and Afterslip on the Chelungpu Decollement Inferred From Postseismic Deformation of the 1999 Chi-Chi Earthquake *P Chen, W Wang, Y Hsu POSTER Abstract
0800	T31A-08	CC Hall E	Multi-Stage Extension And The Mid-Late Miocene Arc-Parallel Extension Event In The Hellenic Ridge *A E Marsellos, W S Kidd POSTER Abstract
0800	T31A-09	CC Hall E	Abyssal Hill Deflections at Pacific-Antarctic Ridge Transform Intersections *M B Croon, S C Cande, J M Stock POSTER Abstract
0800	T31A-10	CC Hall E	Abrupt Change in Convergence Rate as a Mechanism to Induce Extension in Highly Coupled Subduction Zones *J Contreras POSTER Abstract

0800	T31A-11	CC Hall E	Joints and Mineral Veins in Limestone-Marl Alternations: Arrest and Fracture Frequencies *S L Philipp, D Reyer POSTER Abstract
0800	T31A-12	CC Hall E	Abrupt Change in Zircon Hf Isotopic Compositions at ~420 Ma: Implications for Early Paleozoic Ridge Subduction in the Chinese Altai *M Sun, C Yuan, X Long, K Cai, Y Jiang, K Wong, W Xiao, G Zhao, F Wu POSTER Abstract

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