

**THE RIO SAN JUAN COMPLEX (NORTHERN DOMINICAN REPUBLIC):
GEOTHERMOBAROMETRY AND AGE DETERMINATIONS**

KREBS, M. ¹, MARESCH, W V ¹, SCHERTL, H.-P ¹, DRAPER, G. ² & IDLEMAN, B. ³

¹Institute of Geology, Mineralogy and Geophysics, Ruhr-University of Bochum, 44780 Bochum, Germany

²Dept. of Geology, Florida International University, University Park, Miami FL 33199, USA

³Dept. of Earth and Environmental Sciences, Lehigh University, Bethlehem, PA 18015, USA

e-mail: martin.krebs@ruhr-uni-bochum.de

Serpentinite mélanges associated with Cretaceous subduction at the leading edge of the eastward-drifting Caribbean plate now decorate the trace of the Caribbean / North-American suture zone exposed in Cuba and northern Dominican Republic. Blocks of various types of metamorphic rocks (e.g., eclogites, blueschists, metagranitoids) in the mélanges exhibit a series of different but interrelated P-T-paths. Comparison with numerical models yields critical information on the dynamics of a young and maturing subduction-zone / island-arc complex. The P-T paths can be summarized into three categories:

1) *oldest, "nascent" stage*: Typically shallow ("hot") P / T gradients and peak conditions of 700 °C / 22 kbar. Unusual anticlockwise P-T paths with isobaric cooling and later isothermal exhumation are common in eclogites. U-Pb-zircon protolith ages of 139.9 ± 4.1 Ma constrain the beginning of subduction. Lu-Hf-data on Grt-Ep-Amp-Omp-WR yield an age of 103.9 ± 2.2 Ma for peak metamorphic conditions. Rb-Sr-ages of 74.7 ± 0.5 Ma (Phe-Grt-WR) and Ar-Ar (Phe) of 73.18 ± 0.99 Ma constrain the exhumation path.

2) *maturing stage*: Continuous cooling and steepening of the subduction-zone P-T gradient is recorded. Omphacite blueschists yield an age of 80.3 ± 1.1 Ma (Rb-Sr on Phe-Amp-WR) for peak metamorphic conditions (550 °C / 18 kbar) and an age of 72.97 ± 1.01 Ma for cooling below 400 °C (Ar-Ar on Phe) during exhumation.

3) *mature stage*: Typified by jadeite-lawsonite blueschists (380 °C / > 16 kbar) recording very steep, "cold" P / T-gradients. Rb-Sr-ages (Phe-Amp-WR) of 62.1 ± 1.4 Ma date peak metamorphic conditions. This distinctive array of P-T paths in space and time is in accord with subduction-zone models calling for progressive serpentinization, weakening and incorporation into channel-flow circulation of the hanging-wall lithospheric mantle, induced by fluids emanating from the downgoing slab.