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Seep carbonates: First results from Meteor 66 drill cores

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During cruise M66-3 of RV Meteor offshore pacific Nicaragua/Costa Rica continuous authigenic carbonate cores (seep carbonates) were drilled. A total length of 835cm carbonate core from 9 drilling locations were achieved. Highlight is a 317cm long core from the top of Jaco Scarp, a large-scale escarpment caused by subducting seamounds. The detailed petrographic investigation of thin sections show a high small-scale variety in petrographic and lithological units. The carbonate cores can be divided into three main mineralogic sub-units: a) carbonate cores consisting of aragonite only, b) carbonate cores consisting of Mg-calcite only, and c) cores consisting of Mg-calcite clasts with aragonite matrix. The lithologic units are sediments with incorporated seep biology (clams, serpulid tubeworms, foraminifera & gastropods) and extended aragonite cements in voids and channels. Microbial carbonates with clotted microfabrics represent the early carbonate precipitates followed by fibrous botryoidal cements as the late precipitates. A striking phenomenon is that the botryoidal cements are pendulously, they mostly grow top down decreasing in size in the same direction. Under UV-bluelight fluorescence microscopy the clotted carbonates show a high luminescence resulting from the strong incorporation of residual organic matter. In contrast the botryoidal cements show low luminescence with distinct luminescent lines. These lines represent times of stagnation to stagnancy in carbonate precipitation and reflect the growth history of the cements. Preliminary geochemical investigations using electron microprobe show that the distinct luminescent lines not only represent changes in the incorporation of organic matter, they also represent variations in the geochemical content e.g. for strontium. Sub-samples from the carbonate cements were taken for high precision U/Th dating, stable isotopes and XRD analysis. Additional investiga-

tions with electron microprobe, micro-XRD & LA-ICPMS will be used to provide a detailed chronology of the seep carbonates and to reconstruct the history of fluids in the Central American Forearc.