Geomorphic evolution of poljes: Implications for human settlement

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The interdisciplinary Early Farming in Dalmatia Project (EFDP) aims to elucidate the cultural transition to and environmental impact of earliest agriculture in Southeast Europe through detailed study at two known Neolithic loci. The sites under study are located in the well-developed polje-karst of central Dalmatia. The formation of and sedimentation processes in poljes are undefined and may be unique to each polje – dependent on climate, bedrock chemistry, and groundwater [1, 2]. The need to contextualize Neolithic settlement forces us to examine individual polje form and history.

To this end we are measuring soil chemical and physical properties and combining these with surface morphometrics in GIS. In our models the polje acts as a stable landform with non-chaotic water table behavior. For a well-developed karst terrain with large (5-50 cm) clasts in the soil column, this raises further questions about soil physics and morphogenesis. Organic carbon content is relatively low and soils are sodic (basic and non-conductive), indicating a plant-toxic environment for this agriculturally productive locale [3]. XRD analysis revealed extremely high calcite-content, indicating soil sodicity may be buffered. $\delta^{13}C$ is stable throughout the solum, indicating metabolically stable plant communities, despite a regional record of significant periodic drought [4].

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Nd and Pb isotopic signatures of detrital fractions from Labrador Sea and Iceland Basin sediments: Deep oceanic circulation changes over the Holocene

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Radiogenic isotopes of the detrital sedimentary fraction are used to trace sediment provenance. In particular Nd and Pb constitute suitable tracers of the origin of deep-sea sediments of the North Atlantic. In the Labrador Sea their isotopic composition is controlled by the interaction of mid-Atlantic mantle sources and old crustal-derived North American, Canadian, Greenland inputs. Changes in the Nd and Pb signatures of clay-size fraction of Late Glacial and Holocene sediments (MD99-2227, 3460 m, off Southern Greenland) provide constraints on the different sources areas that supplied the fine clayey particles into the Labrador Sea. Changes in their relative contribution through time bring further information on the deep circulation pathways. Radiogenic signature can therefore be used as *indirect* paleoceanographic tracers (Fagel *et al.*, 2004 and references therein). Here we compare the Sm, Nd and Pb sedimentary signatures at the inlet of the Labrador Sea with other cores retrieved along the gyres of North Atlantic Deep Water (NADW) components. Cores were collected along fractures zones on the Mid-Atlantic Ridge: MD99-2254 on the Eastern side of the Bight Fracture Zone (2440 m) and HU91-045-080 on the western side of the Charlie Gibbs Fracture Zone (CGFZ, 3024 m). An additional core HU91-045-091 (3870 m) was taken on the Western side of the CGFZ, in the Labrador Sea but outside of the present deep circulation gyre. Outside the deep gyre, we notice a stable Sm, Nd and Pb composition. In contrast, significant shifts in the radiogenic composition of the sedimentary fractions are evidenced during the last 6 kyr for the other sites. Spatial and temporal changes will be discussed in term of paleoceanographic changes.