

Tracing feedback processes for the abrupt climate change during the last glacial – interglacial period from sediment records. Case study: Sediment records from semienclosed marine areas around the Greek peninsula

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Using basic chaos theory we aspire to highlight the climate feedback processes as the self-organization mechanism of the earth system. The earth system reacts to the external forces, which influence the climate with a number of corresponding physico-biogeochemical processes. We focus on the abrupt climate change of the last glacial-interglacial period of the late Quaternary (Pleistocene –Holocene transition). In our contribution we support the aspect that green house phenomena, due to CO₂ concentration in the atmosphere, was a driving force for the climatic change from the last ice period to the recent interglacial conditions. This aspect is strongly supported in this work versus the general view that mainly astronomic reasons are leading to the global climatic changes. We base our hypothesis on sediment analyses of depositional records in semienclosed marine areas around the Greek peninsula. Analyzing the sediment records of these areas aragonite formation are identified, with an age of 16.000 to 18.000 years. For the aragonite formation, high concentrations of HCO₃⁻ και Ca⁺⁺ in the depositional environment are required. The reactions giving aragonite formation are reactions leading to carbon elimination (CaCO₃) but at the same time producing CO₂, as amplifier of the climate change.

Keywords: climate change, feedback, self-organization, aragonite formation