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Mineralogical Evidence for Warm and Dry Climatic Conditions in the Neo-Tethys (Eastern Turkey) During the Middle Eocene

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Minerals in stratigraphic sections are valuable tools for reconstructing past environmental conditions. Given the state of preservation of clay minerals, it is possible to determine under what conditions they formed, which provides clues about continental weathering (inherited minerals) and geochemical conditions in the water column (neoformed or transformed). This study presents new mineralogical data for the Baskil section, a well-preserved middle Eocene Neo-Tethys sequence (eastern Turkey). This interval coincides with the time of the Middle Eocene Climatic Optimum (MECO), from which we obtained a mineralogical signature of this warming global event in the region. Silicate minerals (phyllosilicates, quartz, and albite) increase in the section from 40.5 to 40 Ma, indicating a higher content of terrigenous input, which diluted the carbonate content. Authigenicpalygorskite increases from the middle to the uppermost portion of the section, indicating favorable conditions in the water column and pore waters for its formation. We recognize that conditions in ocean circulation changed after ~40 Ma, forming a stratified water column with warmer and more saline conditions at greater depths, favoring palygorskite and possibly authigenic dolomite precipitation. The mineralogical variations of the Baskil section reflect how detrital sources and weathering regimes changed in this area during the middle Eocene, and how these changes can be related to global (i.e. MECO), regional, and local processes.

Keywords: clay minerals; paleoclimate; weathering; source area; MECO; Baskil

Biography:

Luigi Jovane is a Professor from the Institute Oceanographic da Universidade de São Paulo (IOUSP). Expert of Magneto stratigraphy with applications in the study of climate variations and global events. Participated in ANDRILL and IODP Expeditions: 325, 344 and 359. Member of the Scientific Committee IODP-CAPES-BRAZIL. President of the International Office of IOUSP Courses taught and research interests.