Understanding Source Rock Chemostratigraphic Data in Terms of Depositional Conditions and Processes.

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We used organic and inorganic geochemical data to re-evaluate the use of cumulative curves of chemical species and Chemical Accumulation Rate Difference (CARD) diagrams (Briceño et al, 1996a, 1996b, 2000), for outlining significant changes in depositional environments, which improve source rock quality. Additionally, we defined precise chemofacies boundaries in the Cretaceous deep marine, organic-rich sedimentary sections of La Luna Fm and its equivalent Navay Fm in Southwestern Venezuela.

Results from Factor Analysis of the large geochemical database, confirmed previous results regarding the grouping of variables in sets controlled by specific physicochemical factors. The following associations were identified: Organic Association (TOC, V, Ni, Mo, Cu, Zn and Cd), Clay Association (Al, K, Th, Nb, Ti, La and Ce) and Calcareous Association (Ca, Sr, LOI). CARD diagrams for species within a specific group indicate changes in the physicochemical parameter controlling such association (i.e. Ni-V for redox; La-Ce CARD for source rock). CARD diagrams for elements from different associations highlight the balance between the physicochemical parameters controlling each association (i.e. Al-Ca CARD for balance between siliciclastic and carbonate dominance).

Combining these diagrams with COT and Pyrolisis data we observe that significant increasing trends in COT concentration, HI, S1 and S2 correspond to: a) increasing values of V-Ni CARD; b) the transition from pelagic carbonate-shale facies to cherty facies; c) the transition from euxinic to disoxic environments; and d) the encompassing of a major MFS.

Keywords: Chemostratigraphy, sedimentation, La Luna, anoxic event, CARD diagrams, palaeoenvironments, source rock.

References:
