Particulate Organic Carbon Age Spectra: An Emerging Picture of Variability Related to Discharge and Basin Type

Brad Rosenheim (1), Valier Galy (2), Elizabeth Williams (1), Brian Roberts (3), and Mead Allison (4)

(1) Tulane University, New Orleans, U.S.A,. (brosenhe@tulane.edu), (2) Woods Hole Oceangraphic Institution, Woods Hole, U.S.A. (vgaly@whoi.edu), (3) Louisiana Universities Marine Consortium, Chauvin, U.S.A. (broberts@lumcon.edu), (4) University of Texas, Institute for Geophysics, Austin, U.S.A. (mallison@mail.utexas.edu)

Applying ramped pyrolysis ^{14}C analysis to particulate organic carbon (POC) constrains on the spectrum of radio-carbon ages in the POC. We summarize a multi-year sampling effort on both the Mississippi Atchafalaya River System (MARS), in which several different discharge regimes were sampled, and the Narayani River in Nepal, for application of this novel technique. The emerging picture from the MARS is one of consistency – discharge plays a role in age spectrum, as does channel type and influence of marine waters. Some variability in the MARS is related to flood provenance, however large river systems such as the MARS are integrative of a range of different lithologies and carbon sources. Age spectra differ between the MARS and monsoon samples in Narayani River, where high incision rates erode old carbonaceous rocks more efficiently during high discharge events. The result of limited sedimentary storage of watershed primary productivity in the Narayani River watershed is substantially wider age spectra than those from the integrative MARS system. It is likely that the Narayani River is less consistent in time than the MARS as contributions of old carbonaceous material likely are driven largely by discharge regime. All Narayani River samples analyzed to date are from different monsoon seasons, but low discharge events are not represented in the dataset. Moving forward, our work will focus on how age spectra change downstream in small mountainous rivers that drain into integrative systems.