



Radiocarbon based studies of high molecular weight (HMW) dissolved organic matter (DOM) cycling

L. Aluwihare (1), R. De Jesus (1), T. Meador (1) and M. Kashgarian (2)

(1) Dept. of Geosciences, Scripps Institution of Oceanography, La Jolla, USA, (2) Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory, Livermore, USA (laluwihare@ucsd.edu / Fax: 858 822 3310 / Phone: 858 822 4886)

Preliminary data from degradation experiments and radiocarbon studies have suggested that high molecular weight (HMW) dissolved organic matter (DOM), as isolated by ultrafiltration using a 1000 Da nominal molecular weight cutoff, is more labile than the remaining DOM reservoir. To investigate the residence time of HMW DOM in the upper ocean and identify factors that control its residence time, we measured the radiocarbon content of HMW DOM isolated from a variety of surface ocean (and some mesopelagic) sites. Consistent with early reports we found that HMW DOM had elevated radiocarbon signatures compared to those measured previously for total DOM, which suggests that the accumulating HMW fraction is enriched in a semi-labile component. This is confirmed by compound-specific and compound class-specific radiocarbon measurements on this reservoir that identify compounds cycling on annual to decadal timescales. However, site-specific differences are apparent. For example, HMW DOM isolated from surface waters of the North Pacific Subtropical Gyre has the most elevated radiocarbon content measured to date on HMW DOM. The larger data set for HMW DOM reveals spatial variations in the residence time and cycling of DOM in the upper ocean that were previously not discernible from radiocarbon measurements on total DOM