An new HPLC approach for isolating amino acids from marine dissolved organic matter for $\Delta^{14}C$ measurement: toward Don $\Delta^{14}C$ ages and cycling rates in the ocean

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Dissolved organic nitrogen (DON) is perhaps the most poorly understood major component of the modern ocean nitrogen (N) cycle. Radiocarbon ($\Delta^{14}C$) isotopic measurements have been perhaps the most important data constraining overall DOM cycling, however almost no DON-specific data exists. Amino acids (AAS) are the major DON component that can be isolated at the molecular level. While no $\Delta^{14}C_{AA}$ data has been published, operationally defined "protein-like" fractions (isolated from DOM via resin extractions) have indicated generally younger $\Delta^{14}C$ ages vs. total DOM, but nevertheless millennial $\Delta^{14}C$ ages in the deep ocean, together suggesting a remarkable preservation of AAs exported from the surface. However, the complexity of DOM hydrolysis products, combined with possible resin C-blank issues, reduces the certainty of such "operational" data. Here we present a new HPLC approach, aimed at purifying unmodified AAS for $\Delta^{14}C$ measurement. We propose that $\Delta^{14}C_{AA}$ values from such purified fractions can provide the first unambiguous $\Delta^{14}C$ proxy for DON ages. We present initial data comparing operational "protein-like" data vs. compound-specific $\Delta^{14}C_{AA}$ data from surface to deep DON isolated from the central Pacific.