

## **Radiocarbon dating of diatom-bound organic compounds – introduction to the project envisaged for North Pacific sediments**

Olga Kwiecien<sup>1,2</sup>, Irka Hajdas<sup>3</sup>, Rink Smittenberg<sup>2</sup>, Samuel Jaccard<sup>2</sup>, Lukas Wacker<sup>3</sup> and Gerald H. Haug<sup>1,2</sup>

<sup>1</sup>DFG-Leibniz Center for Surface Process and Climate Studies at Universität Potsdam, Karl-Liebknecht-Strasse 24, 14476 Potsdam, Germany

<sup>2</sup>ETH-Zürich, Climate Geology, Universitätstrasse 6, CH-8092 Zürich Switzerland

<sup>3</sup>ETH-Zürich, Ion Physic Group Schafmattstrasse 20, CH-8093 Zürich Switzerland

The polar and subpolar ocean is one of the key components controlling the CO<sub>2</sub> system on centennial to glacial-interglacial timescales. The ongoing discussion on climate change and global warming prompt an extensive search in the marine sedimentary records for evidence of past biogeochemical changes that can be used as an analog to predict future behavior of the global CO<sub>2</sub> budget. As polar and subpolar marine sediments are rich in biogenic silica (e.g.: diatoms) but often lack calcium carbonate (e.g.: foraminifera) there is an increasing demand to develop an alternative to foraminifera-based <sup>14</sup>C dating. The main objective of envisaged project is to provide a reliable protocol for a novel <sup>14</sup>C dating of diatom-bound organic matter. In preparation for the radiocarbon Accelerator Mass Spectrometry (AMS) <sup>14</sup>C dating, organic compounds native to purified diatom frustules will be released from their opal matrix by dissolution. Further the dissolved compounds will be separated and identified using liquid chromatography-mass spectrometry (LC-MS). Finally, to ensure the best recovery of size-limited samples, isolated compounds will be analyzed by the ion source fed AMS system. Once established, the diatom-bound organic matter dating will improve the interpretation of polar and subpolar sediment records and therefore the understanding of the oceans' pivotal role in the global CO<sub>2</sub> cycle and past climate change.