

# Effects of sub-glacial transport and shearing on siliceous microfossils found in sediments from the Siple Coast region of West Antarctica

*Jason Coenen<sup>1</sup>, Reed Scherer<sup>1</sup>, Sophie Warny<sup>2</sup>, Jeremy Wei<sup>1</sup>, Isla Castenedas<sup>3</sup>, and the WISSARD science team*

*Northern Illinois University<sup>1</sup>, Louisiana State University<sup>2</sup>, University of Massachusetts Amherst<sup>3</sup>*

Sub-ice sediment samples from the Siple Coast region in West Antarctica; have been collected over the past few decades. We present micropaleontological data from different sub-ice locations part of the Ice streams in the Siple Coast region. The main focus of this study is on the sediments collected from Sub-glacial Lake Whillans (SLW) in 2013. A reanalysis of the upstream portion of the sediments from the Whillans Ice Stream (WIS) was also done, which includes new analysis of the Unicorn shear margin drilled in '93.

Other areas of interest covered in this study are the up and downstream portion of the Kamb Ice Stream (KIS); and the “sticky spot” drilled in the 2000 season. Additionally sediments from the Bindschadler Ice Stream (BIS) were analyzed and are also reported. These samples were all analyzed for siliceous microfossils such as diatoms and sponge spicules. Absolute abundances of diatoms and diatom fragments were performed on sediments in different size classes to compare and contrast sub-ice environments. Sponge Spicules were analyzed for taphonomic effects indicating sub-ice process.

Overall, the Siple Coast Region samples ranged from  $10^6$  to  $10^8$  diatom fragments per gram. SLW, the downstream component of WIS contains  $10^6$  to  $10^7$  diatom fragments per gram, while upstream WIS have higher fragments per gram in some cases and higher numbers of whole diatoms found in upstream WIS than SLW. Counts on the Unicorn shear margin samples have similar numbers to SLW for diatom fragments per gram and lower whole diatom abundance was also noted. The upstream component of KIS has a higher amount of fragments per gram than SLW, while the downstream component and sticky spot yield numbers similar to SLW. The upstream portion of KIS has higher whole diatoms upstream in some cases than SLW and WIS suggesting closer proximity to source beds. While downstream KIS has similar numbers to SLW. BIS has numbers similar to upstream WIS and KIS for diatom fragments per gram. The whole diatoms are more abundant than SLW. The differences in abundance and preservation of diatoms and spicules in the upstream and downstream components of these ice streams, as well as, shear margins and lakes seems to corroborate with the subglacial shearing index of Scherer et al. (2005). Neogene aged marine diatoms dominate KIS and WIS, whereas older Paleogene marine diatoms dominate BIS. This suggests a different source for BIS or further erosion into older sediments.

The highest amount of shear is noted in the sediments from shear margins, SLW and downstream components of ice streams. Upstream portions reveal higher abundance of whole to half diatoms suggesting closer proximity to source beds and less cumulative shear strain. Quantitative analysis of siliceous microfossils preserved in these sub-ice sediments is revealing a complex glacial history. Data presented is providing a better understanding of microfossil conditions at different sub-glacial environments. This will provide further insight into modeling conditions of past and present ice sheet behavior.

- I think it could be in: *The Times They are a-Changin'*, *California Dreamin'*, or *Free Fallin'*. Not really sure what would be the best fit at this time.