

Glaciology Reading Seminar GEOS 692

This theme-based glaciology seminar is intended for graduate students or advanced undergraduates who wish to deepen their knowledge of the peer-reviewed literature in glaciology.

Spring 2013: *Ice Core Records and Ice Sheet Dynamics*.

Instructors:

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Days and Time: Tuesdays 4-5pm

Room: GI 414 (Glaciology Map Room)

Grading: Pass/Fail. To pass, you must read the article and participate in discussions (including those for which you are not the discussion leader).

Assignments: All students must bring a list of at least 3 questions with them to the seminar each week. Students will be required to lead the discussion (individually or in pairs) for 2-4 weekly discussions (depending on the number of students in the course). This includes:

- Providing a ~10 minute overview of the paper (using power point slides, if necessary) that provides the context for the paper within the glaciological literature, including an emphasis on why the line of research is useful and interesting.
- Reading any closely associated additional literature to help the group understand the research methods and conclusions.
- Meeting with your partner (if a pair is leading the discussion) ahead of time to go over any initial questions you both have in the paper.
- Have a list of questions to pose to the group so that the discussion can continue for the hour.

Suggested Schedule:

The following is a list of papers. The exact order in which we will read them will depend on the discussion each week.

Ahn, J., Wahlen, M., Deck, B. L., Brook, J., Mayewski, P. A., Taylor, K. C., & White, J. W. C. (2004). A record of atmospheric CO₂ during the last 40,000 years from the Siple Dome, Antarctica ice core. *Journal of Geophysical Research*, 109(D13), D13305.
doi:10.1029/2003JD004415

Albert, M. R. (2002). ingentaconnect Effects of snow and firn ventilation on sublimation rates. *Annals of Glaciology*.

Albert, M. R., Shultz, E. F., & Perron, F. E., Jr. (2000). Snow and firn permeability at Siple Dome, Antarctica. *Annals of Glaciology*, 31(1), 353–356.
doi:10.3189/172756400781820273

Bay, R., Price, P., & Clow, G. (2001). Climate logging with a new rapid optical technique at Siple Dome. *Geophys Res Lett*, 1–4.

Brook, E. J., White, J., Schilla, A., & Bender, M. L. (2005). Timing of millennial-scale climate change at Siple Dome, West Antarctica, during the last glacial period. *Quaternary Science ...*, 1–11. doi:10.1016/j.quascirev.2005.02.002

Conway, H., Hall, B. L., Denton, G. H., Gades, A. M., & Waddington, E. D. (1999). Past and future grounding-line retreat of the West Antarctic ice sheet. *Science*, 286(5438), 280–283.

Das, S. B., & Alley, R. B. (2005). Characterization and formation of melt layers in polar snow: observations and experiments from West Antarctica. *Journal of Glaciology*, 51(173), 307–312.

Das, S. B., & Alley, R. B. (2008). Rise in frequency of surface melting at Siple Dome through the Holocene: Evidence for increasing marine influence on the climate of West Antarctica. *Journal of Geophysical Research*, 113(D2), D02112. doi:10.1029/2007JD008790

DiPrinzio, C. L., Wilen, L. A., Alley, R. B., Fitzpatrick, J. J., Spencer, M. K., & Gow, A. J. (2005). Fabric and texture at siple dome, antarctica. *Journal of ...*, 51(173), 281–290.

Dunbar, N. W., Zielinski, G. A., & Voisins, D. T. (2003). Tephra layers in the Siple Dome and Taylor Dome ice cores, Antarctica: Sources and correlations. *Journal of Geophysical Research*.

Elsberg, D. H., Harrison, W. D., Zumbege, M. A., Morack, J. L., Pettit, E. C., Waddington, E. D., & Husmann, E. (2004). Depth-and time-dependent vertical strain rates at Siple Dome, Antarctica. *Journal of Glaciology*, 50(171), 511–521.

Engelhardt, H. (2004a). Ice temperature and high geothermal flux at Siple Dome, West Antarctica, from borehole measurements. *Journal of Glaciology*, 50(169), 251–256.

Engelhardt, H. (2004b). Thermal regime and dynamics of the West Antarctic ice sheet. *Annals of Glaciology*, 39(1), 85–92.

Gow, A. (2007a). Physical properties, crystalline textures and c-axis fabrics of the Siple Dome (Antarctica) ice core. *Journal of Glaciology*.

Gow, A. (2007b). Physical properties, crystalline textures and c-axis fabrics of the Siple Dome (Antarctica) ice core. *J. Glaciol.*

Gow, A. J., & Meese, D. A. (2007). The distribution and timing of tephra deposition at Siple Dome, Antarctica: possible climatic and rheologic implications. *Journal of Glaciology*, 53(183), 585–596.

Hawley, R. L., Waddington, E. D., Lamorey, G. W., & Taylor, K. C. (2004). Vertical-strain measurements in firn at Siple Dome, Antarctica. *Journal of Glaciology*, 50(170), 447–452.

Hawley, R., & Waddington, E. (2003). Annual layers in polar firn detected by Borehole Optical Stratigraphy. *Geophysical*

JACOBEL, R. W., & Welch, B. C. (2005). A time marker at 17.5 kyr BP detected throughout West Antarctica. *Annals of Glaciology*, 41(1), 47–51.

Kurbatov, A. V., Zielinski, G. A., Dunbar, N. W., Mayewski, P. A., Meyerson, E. A., Sneed, S. B., & Taylor, K. C. (2006). A 12,000 year record of explosive volcanism in the Siple Dome Ice Core, West Antarctica. *Journal of Geophysical Research*, 111(D12), D12307–. doi:10.1029/2005JD006072

MacGregor, J., & Winebrenner, D. (2007). Modeling englacial radar attenuation at Siple Dome, West Antarctica, using ice chemistry and temperature data. *J. Geophys.*

Nereson, N. (2007). Isochrones and isotherms beneath migrating ice divides. *J. Glaciol*, 1–14.

NERESON, N. A., RAYMOND, C. F., JACOBEL, R. W., & Waddington, E. D. (2000). The accumulation pattern across Siple Dome, West Antarctica, inferred from radar-detected internal layers. *Journal of Glaciology*, 46(152), 75–87.

NERESON, N. A., RAYMOND, C. F., Waddington, E. D., & JACOBEL, R. W. (1998). Migration of the Siple Dome ice divide, West Antarctica. *Journal of Glaciology*, 44(148), 643–652.

Nereson, N., Waddington, E., & Raymond, C. (1996). Predicted age-depth scales for Siple Dome and Inland WAIS Ice Cores in west Antarctica. *Geophysical Research*

Obbard, R. W., Sieg, K. E., Baker, I., Meese, D., & Catania, G. A. (2011). Microstructural evolution in the fine-grained region of the Siple Dome (Antarctica) ice core. *Journal of Glaciology*, 57(206), 1046–1056.

Pettit, E. C., Thorsteinsson, T., Jacobson, H. P., & Waddington, E. D. (2007). The role of crystal fabric in flow near an ice divide. *Journal of Glaciology*, 53(181), 277–288. doi:10.3189/172756507782202766

PETTIT, E., Waddington, E., & Harrison, W. (2011). The crossover stress, anisotropy and the ice flow law at Siple Dome, West Antarctica. *Journal of*

Price, S. F., Conway, H., & Waddington, E. D. (2007). Evidence for late Pleistocene thinning of Siple Dome, West Antarctica. *Journal of Geophysical Research*.

Severinghaus, J. P., Grachev, A., & BATTLE, M. (2001). Thermal fractionation of air in polar firn by seasonal temperature gradients. *Geochem Geophys Geosyst*, 2(7), 1048.

Severinghaus, J., & BATTLE, M. (2006). Fractionation of gases in polar ice during bubble close-off: New constraints from firn air Ne, Kr and Xe observations. *Earth and Planetary Science Letters*, 244(1-2), 474–500. doi:10.1016/j.epsl.2006.01.032

Severinghaus, J., Grachev, A., & Luz, B. (2003). *ScienceDirect - Geochimica et Cosmochimica Acta* : A method for precise measurement of argon 40/36 and krypton/argon ratios in trapped air in polar ice with applications to past firn thickness and abrupt climate change in Greenland and at Siple Dome, Antarctica. ... *Et Cosmochimica Acta*.

Taylor, K. C., Alley, R. B., Meese, D. A., Spencer, M. K., Brook, E. J., Dunbar, N. W., et al. (2004a). Dating the Siple Dome (Antarctica) ice core by manual and computer interpretation of annual layering. *Journal of Glaciology*, 50(170), 453–461. doi:10.3189/172756504781829864

Taylor, K., White, J., & Severinghaus, J. (2004b). ScienceDirect - Quaternary Science Reviews : Abrupt climate change around 22 ka on the Siple Coast of Antarctica. *Quaternary Science*

Waddington, E., & Bolzan, J. (2001). ingentaconnect Potential for stratigraphic folding near ice-sheet centers. *Journal of Glaciology*.

Waddington, E., Conway, H., & Steig, E. (2005). Decoding the dipstick: Thickness of Siple Dome, West Antarctica, at the last glacial maximum.

Zumberge, M. A., Elsberg, D. H., Harrison, W. D., Husmann, E., Morack, J. L., Pettit, E. C., & Waddington, E. D. (2002a). Measurement of vertical strain and velocity at Siple Dome, Antarctica, with optical sensors. *Journal of Glaciology*, 48(161), 217–225.