Classic Papers in Glaciology
GEOS 692: Spring 2009

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Days and Time: TBD, First meeting Tue Jan 27th 1pm

Classroom: GI 414 (Glaciology Map Room)

Course Description: The theme of this reading seminar is "Classic Papers in Glaciology". It will include some readings of the history of glaciology as well as some of the fundamental papers on key glaciological processes such as those by Glen, Nye, and Weertman. Students will be expected to present and lead the discussion of two papers over the course of the semester.

Electronic Reserves: Because many of these papers are not easy to find, we will post scanned version on electronic reserves for you to download. Click here to go to Electronic Reserves. There is no password on the system.

Schedule of Readings: Here is a PDF of the readings.

Week 1: History of Glaciology

Garry K. C. Clarke. A short history of scientific investigations on glaciers. *Journal of Glaciology*, Special Issue:4–24, 1987.

Week 2: Ice Deformation Mechanisms - Marijke

R. M. Deeley and P. H. Parr. The viscosity of glacier ice. *Philosophical Magazine Sixth Series*, 26(151):85–111, 1913.

E. Orowan. Joint meeting of the British Glaciological Society, the British Rheologists' Club and the Institute of Metals. *Journal of Glaciology*, 1(5):231–240, 1949.

M. F. Perutz. Mechanism of glacier flow. *Proceedings of the Physical Society*, 52(289):132–135, 1940.

Week 3: Ice Deformation Mechanisms - Bob

J. W. Glen. The flow law of ice. A discussion of the assumptions made in glacier theory, their experimental foundations and consequences. *International Association of Scientific Hydrology*, 47:171–183, 1958.

J. Weertman. Creep of ice. In E. Whalley, S.J. Jones, and L.W. Gold, editors, *Physics and Chemistry of Ice*, pages 320–337. Royal Society of Canada, 1973.

Week 4: Sliding - Marijke

J. F. Nye. A calculation on the sliding of ice over a wavy surface using a Newtonian viscous approximation. *Proceedings of the Royal Society of London, Ser A*, 311:445–467, 1969.

J. Weertman. On the sliding of glaciers. *Journal of Glaciology*, 3:33–38, 1957.

Week 5: Ice Flow Velocity and Stress - Jason

G. Bodvarsson. On the flow of ice-sheets and glaciers. *Jökull*, 5:1–8, 1955.

J. Weertman. Deformation of floating ice shelves. *Journal of Glaciology*, 3:39–42, 1957.

Week 6: Ice Flow Velocity and Stress - Joe

J. F. Nye. The distribution of stress and velocity in glaciers and ice-sheets. *Proceedings of the Royal Society of London, Ser A*, 239:113–133, 1957.

J. F. Nye. The flow of a glacier in a channel of rectangular, elliptic, or parabolic cross-section. *Journal of Glaciology*, 5:661–690, 1965.

Week 7: Ice Sheet Shape - Joe

S. S. Vialov. Regularity of glacier shields movement and the theory of plastic viscous flow. *International Association of Scientific Hydrology*, 47:266–275, 1958.

J. Weertman. Stability of ice age ice sheets. *Journal of Geophysical Research*, 66(11):3783–3792, 1961.

Week 8: Ice Sheet Stability - Bob

P. Halfar. On the dynamics of the ice sheets. *Journal of Geophysical Research*, 86(C11):11065–11072, 1981.

J. H. Mercer. West Antarctic ice sheet and CO_2 greenhouse effect: a threat of disaster. *Nature*, 271:321–325, 1978.

Week 9: Temperature and Timescale - Barbara

W. Dansgaard and S. J. Johnsen. A flow model and a time scale for the ice core from Camp Century, Greenland. *Journal of Glaciology*, 8:215–223, 1969.

G. de Q. Robin. Ice movement and temperature distribution in glaciers and ice sheets. *Journal of Glaciology*, 2:523–532, 1955.

Week 10: Glacier Hydrology - Barbara

H. Röthlisberger. Water pressure in intra- and subglacial channels. *Journal of Glaciology*, 11(62):177-203, 1972.

R. L. Shreve. Movement of water in glaciers. *Journal of Glaciology*, 62:205–214, 1972.

Week 10: Glacier Hydrology - Jason

B. Kamb. Glacier surge mechanism based on linked cavity configuration of the basal water conduit system. *Journal of Geophysical Research*, 92(B9):90839100, 1987.

Week 11: Surges and Tidewater Glacier Cycle - David

M. F. Meier and A. Post. Fast tidewater glaciers. *Journal of Geophysical Research*, 92(B9):9051–9058, 1987.

C. F. Raymond. How do glaciers surge? a review. *Journal of Geophysical Research*, 92(B9):9121–9134, 1987.

Week 13 : Snowpack Structure - Mark and Carl

C. Benson. Stratigraphic studies in the snow and firn of the greenland ice sheet. *CRREL Research Report*, 70:1–93, 1962.

Week 14 : Glacier Response to Change - David

J. F. Nye. On the theory of the advance and retreat of glaciers. *Geophysical Journal of the Royal Astonomical Society*, 7:431–456, 1963.

J. F. Nye. The response of a glacier to changes in the rate of nourishment and wastage. *Proceedings of the Royal Society of London, Ser A*, 275:87–112, 1963.