**ESS 431 PRINCIPLES OF GLACIOLOGY**

**ESS 505 THE CRYOSPHERE**

**Lecture 11 – Recent Changes in the Cryosphere**

*Due Wednesday, October 30 2019, at start of class*

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| Alley, R. B. and I. M. Whillans (1991). Changes in the West Antarctic Ice Sheet. *Science* 254(5034), 959–963. Alley, R.B., S. Anandakrishnan, K. Christianson, H. J. Horgan, A. Muto, B. R. Parizek, D. Pollard, and R. T. Walker (2015). Oceanic Forcing of Ice Sheet Retreat: West Antarctica and More. *Annual Review of Earth and Planetary Sciences* 43, 207–231, doi: 10.1146/annurev-earth-060614-105344. |

1. Name four lines of evidence that indicate the West Antarctic Ice Sheet likely at least partially collapsed during the most-recent previous interglacial period.
2. Why do ice sheets tend to grow as precipitation decreases, but shrink as precipitation increases?
3. Describe the marine ice-sheet positive feedback retreat mechanism termed marine ice-sheet instability. Draw a two-dimensional ice-sheet profile that illustrates this process.
4. We often focus on ice-sheet retreat, but ice-sheet advance presents an equally important and puzzling conundrum. Posit a mechanism that enables ice-sheet stabilization and eventual re-advance following retreat.