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## **Greenland Ice Sheet Mass Loss Will Exceed Holocene Values this Century**

The Greenland Ice Sheet (GrIS) is losing mass at an elevated rate. Given the short-term nature of the observational record, it is difficult to assess the historical significance of this mass-loss trend. In this talk, I will place contemporary and future rates of GrIS mass loss within the context of natural variability of the past 12,000 years by forcing a highly resolved ice-sheet model with a new ensemble of climate histories constrained by ice core data. Our simulations take place in surface-mass-balance-dominated southwestern Greenland. The results agree favorably with independent chronologies of GrIS margin history, based on over a decade of cosmogenic nuclide exposure dating and local production rate calibration by joint Buffalo-Lamont collaboration. The highest Holocene ice loss rates occurred in the early Holocene, and were up to 6000 Gt/century, similar to the contemporary (2000 to 2018 CE) value of ca. 6100 Gt/century. Simulations of future southwestern GrIS mass loss following Representative Concentration Pathway (RCP) scenarios corresponding to the lowest (RCP2.6) and highest (RCP8.5) greenhouse gas concentrations range from 8800 to 35,900 Gt/century. These rates of GrIS mass loss exceed the maximum rates over the past 12,000 years, and because they scale linearly with the GrIS as a whole, our results indicate, with high confidence, that the GrIS mass loss rate will exceed Holocene values this century.