



Seminar Presenter: Marco Tedesco



Marco Tedesco is a Research Professor at the Lamont-Doherty Earth Observatory at Columbia University in Palisades, New York, where he leads the Cryospheric Processes Laboratory. He received his Ph.D. from the Institute for Applied Physics in Florence, Italy. He has published widely on processes that affect the mass balance of the Greenland Ice Sheet. He also participates annually in drafting the Arctic Report Card a peer-reviewed source for current information on the Arctic environmental system.

An Arctic Tango: atmospheric and surface processes modulating the mass balance of the Greenland ice sheet

The contribution to sea-level rise by mass loss from Greenland is projected to exceed 20 cm by the end of this century, with the past two decades being characterized by increased melting and total mass loss. Remarkably, the summer of 2012 set new records for surface melt extent and duration, and a record 570 ± 100 Gt in total mass loss, doubling the average annual loss rate of 260 ± 100 Gt for the 2003–2012 period.

Atmospheric circulation affects the energy and mass budgets of the Greenland ice sheet by controlling cloud coverage and optical depth and by driving the spatial distribution and amount of surface melting and accumulation. Improving our understanding of the impact of atmospheric circulation on Greenland's surface mass balance is, therefore, crucial for the refinement of climate and ice-sheet models, and will ultimately enable improved estimates of current and future contributions to sea level by the largest ice body in the Northern Hemisphere. On the other hand, the surface energy balance and meltwater production of the Greenland ice sheet are modulated by surface and sub-surface processes, such as snow and ice albedo, densification with total mass loss also impacted by the interaction between supraglacial, englacial and subglacial hydrological systems.

In this talk, I will focus on recent work focusing on reducing the uncertainty of estimates of current and future sea level contribution from Greenland through the study of the impact of atmospheric and surface processes driving the mass loss, their interaction as well as their impact on the partitioning between surface (e.g., runoff) and volume losses (e.g., calving). In particular, I will focus on the albedo decline over the past few decades and on driving processes, on the importance of ice layers in snow/firn and on the impact of large scale circulation patterns and atmospheric conditions (e.g., NAO).

Date: February 6, 2017

Place: PACCAR 205

Time: 4:10-5:00 pm