

EGGS seminar
Thursday, May 19, 2016
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"A link between ozone photochemistry and atmospheric overturning in the ice-core gas record"

Much of the uncertainty in modeling past and future climates has been attributed to uncertainties in the representation of clouds and the atmospheric circulation. These dynamical properties of the atmosphere are only indirectly preserved in the paleoclimate record, usually as geographical patterns of dust deposition and precipitation. These records primarily probe the horizontal aspects of the global circulation, leaving the vertical aspects of atmospheric circulation obscured from view. I will present a new clumped-isotope tracer that exploits circulation-sensitive patterns of O₃ photochemistry in the free troposphere. I will argue that the proportions of ¹⁸O/¹⁶O in tropospheric O₂ record vertical properties of tropical circulation: More photochemistry at higher (colder) altitudes yields higher proportions of ¹⁸O/¹⁶O, and vice versa. Preliminary results from the ice-core record show decadal-to-centennial-scale variations in tropical circulation that resemble records of precipitation in the tropical Pacific over the past millennium.