The Role of Sulfate Aerosol Forcing and Air-Sea Feedbacks in Generating Strong Seasonality of Climate Change over the Mid-latitude Oceans

Daniel Vimont¹, Jack Zweifel, Sagar Rathod, Tristan L'Ecuyer, and David Henderson ¹University of Wisconsin-Madison, Contact: dvimont@wisc.edu

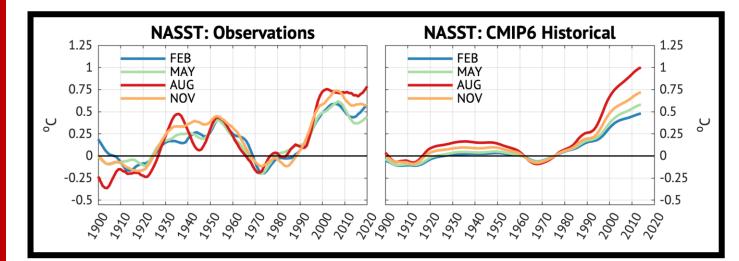
EESD RGMA Project DE-SC0022029

Poster #104

The Role of Sulfate Aerosol Forcing and Air-Sea Feedbacks in Generating Strong Seasonality of Climate Change over the Mid-latitude Oceans

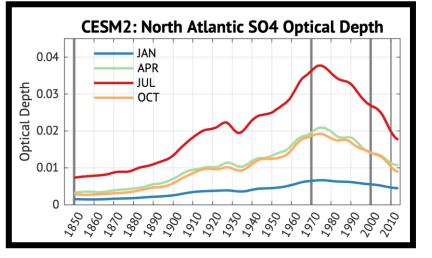
Daniel Vimont¹, Jack Zweifel, Sagar Rathod, Tristan L'Ecuyer, and David Henderson

¹University of Wisconsin-Madison, Contact: dvimont@wisc.edu



Since 1970, North Atlantic SST has warmed 50% faster during late **SUMMER** than late **WINTER**

Sulfate aerosols are **FIVE TIMES** more abundant during **SUMMER** than **WINTER** despite no seasonality in SO₂ emissions



The Role of Sulfate Aerosol Forcing and Air-Sea Feedbacks in Generating Strong Seasonality of Climate Change over the Mid-latitude Oceans

Daniel Vimont¹, Jack Zweifel, Sagar Rathod, Tristan L'Ecuyer, and David Henderson

¹University of Wisconsin-Madison, Contact: dvimont@wisc.edu

Why do sulfate aerosols exhibit How does sulfate seasonality How do the mean state, radiative strong seasonality? forcing, and air-sea feedbacks affect sulfate direct and cloud radiative forcing? contribute to SST seasonality? Total Aerosol Forcing at Top of Atmosphere CESM2: SO₄ Burden Box = 30N-60N; 300-350 $d(\rho c H(t)T)$ 3.0 1970 - 2010 US SO₂ Emissions -k(t)T + F(t)2.5 dt JANUARY All Constant 2.0 Seas. MLD 0.2 Ч.1.5 Е 0.15 0.15 S ≥ 1.0 0.05 0.5 UL V 0.0 Seas. MLD + FDBK Seas. MLD + FDBK + FCNG -0 0.2 2 10 Month 0.15 0.15 0.1 0 S **Direct Aerosol Forcing** Aerosol-Cloud Forcing 0.05 0.05 $kg m^{-2}$ Surface Albedo Effect 0000 010 076 975 Total Aerosol Forcing

The Role of Sulfate Aerosol Forcing and Air-Sea Feedbacks in Generating Strong Seasonality of Climate Change over the Mid-latitude Oceans

Daniel Vimont¹, Jack Zweifel, Sagar Rathod, Tristan L'Ecuyer, and David Henderson ¹University of Wisconsin-Madison, Contact: dvimont@wisc.edu

EESD RGMA Project DE-SC0022029

Poster #104