

John A. Dykema's research while affiliated with Harvard University and other places

Publications (3)

Production of Sulfates Onboard an Aircraft: Implications for the Cost and Feasibility of Stratospheric Solar Geoengineering

[Article](#)

Apr 2018

 Jordan P. Smith ·  John A. Dykema ·  David W Keith

Injection of sulfate aerosols into the stratosphere, a form of solar geoengineering, has been proposed as a means to reduce some climatic changes by decreasing net anthropogenic radiative forcing. The cost and technical feasibility of forming aerosols with the appropriate size distribution is uncertain. We examine the possibility of producing the relevant sulfur species, SO₂ or SO₃, by in situ conversion from elemental sulfur onboard an...

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A Case Study of Convectively Sourced Water Vapor Observed in the Overworld Stratosphere over the United States

[Article](#)

Aug 2017 · Journal of Geophysical Research Atmospheres

 Jessica Smith ·  David M Wilmoth ·  Kristopher M. Bedka · [...] ·  A Paulson

On August 27, 2013, during the Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys (SEAC4RS) field mission, NASA's ER-2 research aircraft encountered a region of enhanced water vapor, extending over a depth of approximately 2 km and a minimum areal extent of 20,000 km² in the stratosphere (375 K to 415 K potential temperature), south of the Great Lakes (42°N, 90°W). Water vap...

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Stratospheric ozone over the United States in summer linked to observations of convection and temperature via chlorine and bromine catalysis

[Article](#)

Jun 2017 · Proceedings of the National Academy of Sciences

 James G. Anderson ·  Debra K. Weisenstein ·  Kenneth P. Bowman · [...] ·  Steven C. Wofsy

We present observations defining (i) the frequency and depth of convective penetration of water into the stratosphere over the United States in summer using the Next-Generation Radar system; (ii) the altitude-dependent distribution of inorganic chlorine established in the same coordinate system as the radar observations; (iii) the high resolution temperature structure in the stratosphere over the United States in summer that resolves...

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... A key measure of the importance of methane clathrates is reflected in the fact that these clathrates contain an amount of chemical energy two to three times the chemical energy contained in all deposits of petroleum, natural gas, and coal combined worldwide. 7 As the Arctic Basin melts in response to increasing temperatures, carbon in surface soils will be released as CH₄ and CO₂ as the depth and geographic range of melt zones increase. For a point of reference, the release of 0.5% of the labile carbon in the upper 3 meters of the Alaska North Slope and Northern Siberia per annum equals the total carbon released to the atmosphere from all fossil fuel extraction, distribution and combustion per annum. ...

Reference: [Coupling free radical catalysis, climate change, and human health](#)

Stratospheric ozone over the United States in summer linked to observations of convection and temperature via chlorine and bromine catalysis

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Jun 2017

James G. Anderson · Debra K. Weisenstein · Kenneth P. Bowman · Cameron R. Homeyer · Steven C. Wofsy

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Stephen L. Gray

- 

Stephen Leroy
Atmospheric and Environmental Research, Inc.
- 

Jessica Smith
Harvard University
- 

James G. Anderson
- 

D. S. Sayres
- 

D. M. Wilmouth
- 

Kenneth P. Bowman
- 

Cameron R. Homeyer
- 

David W Keith
Harvard University
- 

Kristopher M. Bedka
NASA
- 

Jon Dean-Day
Bay Area Environmental Research Institute

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