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Brief bio

Dr. Brad Weir is the lead developer of NASA's Goddard Earth Observing System (GEOS) Constituent Data Assimilation System (CoDAS) — a state-of-the-art statistical method for estimating atmospheric trace gas abundances based on satellite observations. He has over 10 years of experience developing and applying mathematical and statistical methods to address questions about the physics, chemistry, and biology of the Earth's atmosphere, ocean, and land surface. His work has appeared in Science, the websites of National Geographic and the BBC, and the NASA/ESA/JAXA trilateral COVID-19 dashboard.

Positions

2013 – present	Scientist. Global Modeling and Assimilation Office (GMAO), NASA Goddard Space Flight Center contract through Universities Space Research Association (USRA).
2010 – 2013	Post-doctoral Research Associate. College of Earth, Ocean, and Atmospheric Sciences, Oregon State University.

Education

2003 – 2010	Ph.D., Mathematics, University of Arizona.
1999 – 2003	B.A. with honors, Mathematics, New York University.

Publications

- Sweeney et al. (2020). "Atmospheric carbon cycle dynamics over the ABoVE domain: an integrated analysis using aircraft observations (Arctic-CAP) and model simulations (GEOS)" *Atmos. Chem. Phys. Discuss.*, in review, doi:10.5194/acp-2020-609
- Weir et al. (2020). "Calibrating satellite-derived carbon fluxes for retrospective and near real-time assimilation systems." *Atmos. Chem. Phys. Discuss.*, in review, doi:10.5194/acp-2020-496
- Wargan et al. (2020). "The anomalously small 2019 Antarctic ozone hole in an assimilation of MLS observations with the GEOS Constituent Data Assimilation System." *J. Geophys. Res.: Atmos.*, 125, doi:10.1029/2020JD033335
- Lee et al. (2020). "Impact of a Regional US Drought on Land and Atmospheric Carbon." *J. Geophys. Res.: Biogeosci.*, in press, doi:10.1029/2019jg005599
- Bell et al. (2020). "Evaluation of OCO−2 XCO2 Variability at Local and Synoptic Scales using Lidar and In Situ Observations from the ACT−America Campaigns." *J. Geophys. Res.: Atmos.*, 125, doi:10.1029/2019jd031400

- Wargan et al. (2020). "Toward a Reanalysis of Stratospheric Ozone for Trend Studies: Assimilation of the Aura Microwave Limb Sounder and Ozone Mapping and Profiler Suite Limb Profiler Data." *J. Geophys. Res.: Atmos.*, 125, doi:10.1029/2019jd031892
- Schuh et al. (2019). "Quantifying the impact of atmospheric transport uncertainty on CO2 surface flux estimates." *Global Biogeochem. Cycles*, 33, 484-500, doi:10.1029/2018GB006086
- Lee et al. (2018). "The impact of spatiotemporal variability in atmospheric CO2 concentration on global terrestrial carbon fluxes." *Biogeosci.*, 15, 5635-5652, doi:10.5194/bg-15-5635-2018
- Eldering et al. (2017). "The Orbiting Carbon Observatory-2 early science investigations of regional carbon dioxide fluxes." *Science*, 358, doi:10.1126/science.aam5745
- Weir et al. (2013). "A potential implicit particle smoother for high-dimensional systems." *Nonlin. Processes Geophys.*, 20, 1047-1060, doi:10.5194/npg-20-1047-2013
- Weir et al. (2013). "Implicit estimation of ecological model parameters." *Bull. Math. Biol.*, 75, 223-257, doi:10.1007/s11538-012-9801-6
- Weir et al. (2011). "A vortex force analysis of the interaction of rip currents and surface gravity waves." *J. Geophys. Res.: Oceans*, 116, C05001, doi:10.1029/2010JC006232

Selected Invited Presentations

- Weir, B., L.E. Ott, A. Chatterjee, K. Wargan, and S. Pawson (2017). The GEOS-Carb reanalysis of atmospheric carbon dioxide. GMAO Seminar Series on Earth System Sceince, Global Modeling and Assimilation Office, Greenbelt, Maryland, 5 April.
- Weir, B., R.N. Miller, and Y.H. Spitz (2013). Implicit assimilation of satellite-based observations of ocean color. New Pathways to Understanding and Managing Marine Ecosystems: Quantifying Uncertainty and Risk Using Biophysical-Statistical Models of the Marine Environment, CSIRO Marine and Atmospheric Research, Hobart, Australia, 27-30 May.
- Weir, B., R.N. Miller, and Y.H. Spitz (2013). Implicit parameter estimation. Probabilistic Approaches to Data Assimilation for Earth Systems, Banff International Research Station, Banff, Alberta, Canada, 17-22 Feb.
- Weir, B., R.N. Miller, and Y.H. Spitz (2013). Implicit sampling: theory and implementation. International Workshop on Particle Filters for Data Assimilation, Institute for Statistical Mathematics, Tachikawa, Tokyo, Japan, 7 Feb.
- Weir, B., R.N. Miller, and Y.H. Spitz (2012). Implicit assimilation for marine ecological models. Abstract NG41D-02 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., USA, 3-7 Dec.

Awards & Fellowships

2015 & 2019	Outstanding Scientific Contribution. GMAO, NASA.
2013	Early Career Travel Award. CSIRO Marine and Atmospheric Research.
2003	Graduate VIGRE Fellowship. Department of Mathematics, University of Arizona.
2003	Perley Lenwood Thorne Medal. Department of Mathematics, New York University.