SORS: Contribution of climate and landuse changes to dust decadal variability

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Abstract: Over the last decade dust models have significantly improved the physical representation of dust emission as well as the location of the sources. However, comparisons of dust model results with long-term observations indicates that models are unable to reproduce observed decadal variability of dust. Such discrepancy may be related to vegetation growth and decay in relation to rainy and drought periods. Because vegetation and its characteristics are affected by both direct anthropogenic changes (e.g. deforestation) and by climate change (e.g. dieback due to drought), it is important to include vegetation dynamics as one of the predictors of dust emission to accurately simulate past and future dust loading.
In this presentation, after summarizing the most prominent changes of dust concentration observed in different parts of the world, we will shortly describe the recent implementation of a dust module within the dynamic land model (LM3), terrestrial component of the GFDL climate models. Using 140 years (1871-2010) simulations realized with this new version of GFDL coupled climate models, we will compare globally and regionally the time series of dust concentration with observations. The decadal variability of dust characteristics will then be analyzed focusing on the contribution of climate and landuse changes.

BIO: Paul Ginoux is a Senior Scientist at the NOAA Geophysical Fluid Dynamics Laboratory, and gives lectures at Princeton University on “Aerosol Modeling and Observations”. He has been developing aerosol and chemistry models over the last 2 decades, first at NCAR for his PhD, then at NASA with the GOCART model, and finally at GFDL with the Coupled Climate Models. He has developed dust source inventories which are widely used by regional and global climate and forecasting models. With several publications reaching more than 500 citations, he was recognized by ISI Thomson as Highly Cited Scientist in 2014. He has been a contributing author to the IPCC TAR and AR5. He received in 2013 the AGU Ascent award for “sustained pioneering work on aerosols".

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