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TITLE: Assessments of the Emission and Impact of Smoke from the 2002 Yakutsk Wildfires using the WRF-Chem-SMOKE Model and Satellite Data

PRESENTATION TYPE: Poster Requested

CURRENT SECTION/FOCUS GROUP: Global Environmental Change (GC)

CURRENT SESSION: GC16. Regional Climate Impacts 7. Environmental, Socio-economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System: The Role of Remote Sensing and Integrative Studies

AUTHORS (FIRST NAME, LAST NAME): Zheng Lu¹, Irina N Sokolik¹, Amber Jeanine Soja²

INSTITUTIONS (ALL): 1. EAS, Georgia Institute of Technolog, Atlanta, GA, United States.

2. National Institute of Aerospace (NIA)/NASA Langley Research Center (LaRC), Hampton, VA, United States.

Title of Team:

SPONSOR NAME: Zheng Lu

ABSTRACT BODY: In this study, we examine the emission and impact of smoke aerosols during an extreme fire season in summer 2002 in the Yakutsk region, Russia. MODIS active fire products are used to compute the smoke emission that provides an input into the WRF-Chem-SMOKE model. WRF-Chem-SMOKE is a modified version of the public WRF-Chem version 3.3 with a fully coupled atmospheric dynamic-aerosol-cloud microphysics-precipitation-radiation modules. A new module was developed to compute size- and composition-resolved smoke aerosols based on MODIS fire radiative power (FRP). The FRP-based emission was evaluated against independent data, including the Global Fire Emissions Database (GFED). In addition, 3D smoke fields and aerosol optical depth (AOD) simulated with WRF-Chem-SMOKE were compared against satellite data (MODIS AOD and OMI AI) to further assess the realism of the FRP-based smoke emission. Based on WRF-Chem-SMOKE data, we analyze changes in cloud properties (LWP, IWP, etc.) and resulting changes in the amount and spatiotemporal distribution of precipitation, with the emphasis on the role of uncertainties in smoke emission.

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INDEX TERMS: [0305] ATMOSPHERIC COMPOSITION AND STRUCTURE / Aerosols and particles, [3311] ATMOSPHERIC PROCESSES / Clouds and aerosols.