Special Session (SS09) on:

Analytical Approaches to Climate Change at Multiple Scales

Organiser:

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The aim and scope of the special session:

This session includes three papers that address analytical approaches to address climate change. One focused on the regional scale, one on the state scale, and one on the metropolitan scale. The first paper (Kaaap et al) addresses climate change at the regional scale and presents the result of four scenarios developed using a loosely couple suite of econometric, land use, transportation, and environmental impact models. These models highlight the potential effects of exogenous trends, such as autonomous and connected vehicles, energy prices, and economic restructuring on urban form, travel behavior, greenhouse gas emissions, and nutrient loading. Then using simulation techniques, the paper identifies robust strategies that serve to lower greenhouse gases and mitigate climate change under various assumptions regarding exogenous forces.

The second paper (Lewis et al) examines state level approaches to mitigate greenhouse gas emissions from transportation, focusing on the integration of land use and transportation in California, Maryland, Oregon and Washington. Though greenhouse gas emissions extend beyond state boundaries, the political boundaries are well-suited to addressing greenhouse gas emissions from transportation. This paper highlights the analytical approaches for identifying strategies to reduce GHG and describe the models used at the state level. Then, this paper moves beyond the models to identify political barriers to implementing various strategies to reduce GHG from transportation.

In the third paper, Arnab Chakraborty and Bev Wilson present an approach for mapping and addressing the negative impacts of extreme heat events on vulnerable populations. The authors assess distribution of surface temperatures in the Chicago metropolitan area using Daymet dataset [maintained by the Oak Ridge National Laboratory and hosted by the NASA-supported Distributed Active Archive Center]. Separately, they identify locations of populations most vulnerable to extreme heat events using Census data and maximum likelihood factor analysis to derive an index that captures where residents exhibit greater sensitivity and/or lower adaptive capacity to extreme heat. Using overlays and scenario analysis, the authors identify areas with the greatest need for emergency response in case of future extreme heat events, and well as areas that need long term adaptation and mitigation in the long term. Finally, the authors illustrate a web-based tool developed to assist organizations like Chicago's Office of Emergency Management & Communications use this information.

Paper #1: Autonomous Vehicles, Energy Prices, and Demographic Change in the Baltimore-Washington Region: Scenario Analysis with Loosely Coupled Models.

- Gerrit-Jan Knaap, University of Maryland
- Dan Engelberg, University of Maryland
- Uri Avin, University of Maryland
- Sevgi Erdogan, University of Maryland
- Fred Ducca, University of Maryland

Paper #2: Assessing State Efforts to Integrate Transportation, Land Use and Climate Change

- Rebecca Lewis, University of Oregon
- Robert Zako, University of Oregon
- Rory Isbell, University of Oregon
- Alexis Biddle, University of Oregon

Paper #3: Planning for Extreme Heat: A Vulnerability-Oriented Approach

- Arnab Chakraborty, University of Illinois
- Bev Wilson, University of Illinois

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