



Using weather, climate and air quality data in transportation and disaster management

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A few things about me

- RDA Newcomer
- Transportation Researcher at the Hellenic Institute of Transport (HIT) – Centre for Research and Technology Hellas (CERTH)
- PhD candidate at the National Technical University of Athens (NTUA)
- MSc in Transportation from TU Delft
- Rural and Surveying Engineer Aristotle University of Thessaloniki (AUTH)

CERTH - HIT

- The Hellenic Institute of Transport is part of the Centre for Research and Technology Hellas
- Non-profit entity, founded in 2000, organized under private law, under the auspices of the General Secretariat for Research and Technology, of the Greek Ministry of Education.
- Main objectives include the execution and support of applied research activities in the field of transportation in Greece, including:
 - Organization, Operations, Planning and Development
 - Standardization
 - Economic analyses
 - Management
 - Vehicle technology
 - Impact assessment of surface, maritime, air, and multimodal transport services
 - Training and education activities in related fields
 - Dissemination of research activities
 - Representation of Greece in Transport Research and other relevant scientific fora abroad

CERTH-HIT, Weather, Climate and Disasters

RAIN-EX (EC)

- Ensure the availability of transport infrastructure with regards to natural hazards, especially extreme rainfall, through a risk-based design of the former.

MOWE-IT (FP7)

- Quantification of climate change related impacts on transportation infrastructures, networks and operations and. Formulation of measures, policies, strategies and roadmaps.

WEATHER (FP7)

- Identification and assessment of critical and vulnerable transport infrastructures.

National adaptation study (Bank of Greece)

- Elaboration of the Transport Sector adaptation plan of the National Adaptation Study.

RESCUE (Interreg)

- Decision Support System for transportation networks response and recovery in case of catastrophic events.

PROOHF (Interreg)

- Methodological framework for risk assessment of historical heritage monument sites in case of fires.

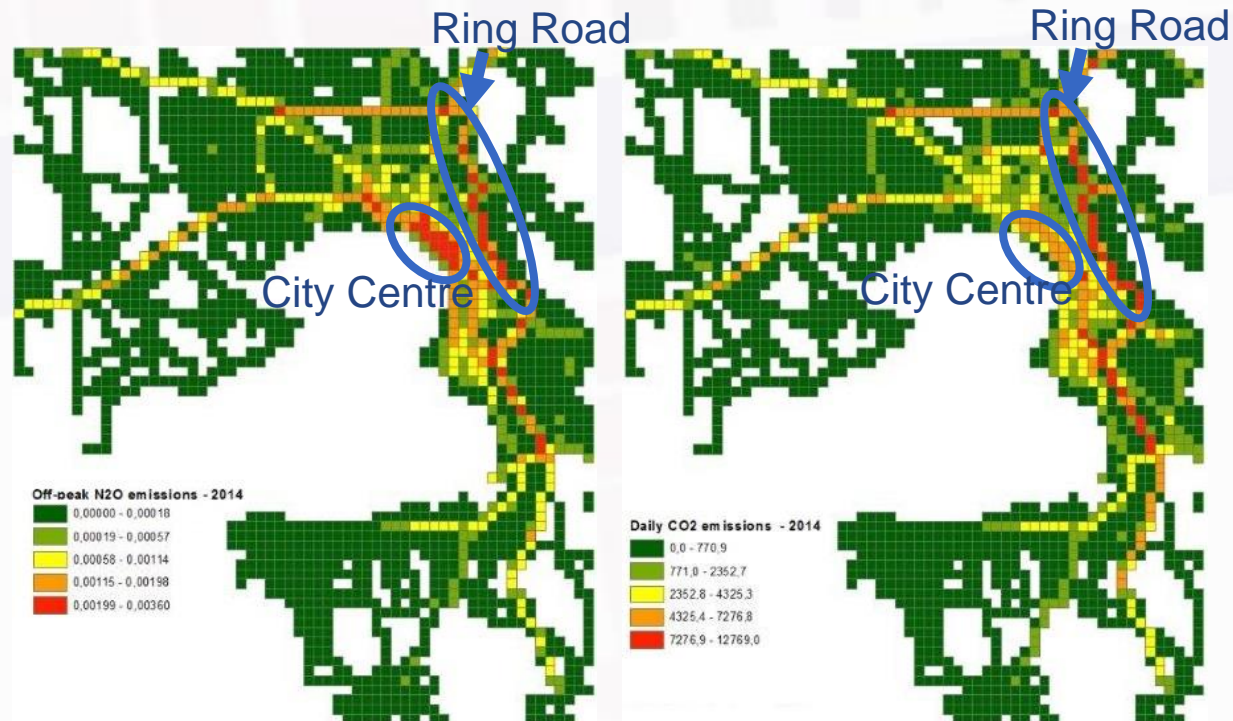
DECIDE (Interreg)

- Quantitative and qualitative assessment of extreme weather events and natural and manmade hazards.

Transportation and air quality

A well established relationship

- 5% to 53% of ambient pollution attributed to traffic
- Environmental Routing attempts
- Limited availability of air quality related data



Transportation and weather

A well established relationship

Transportation models assume average weather conditions

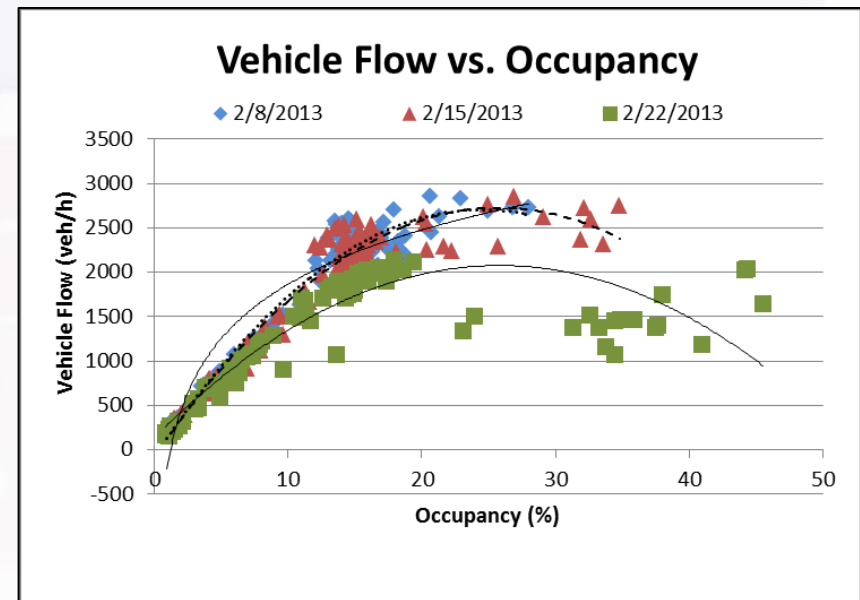
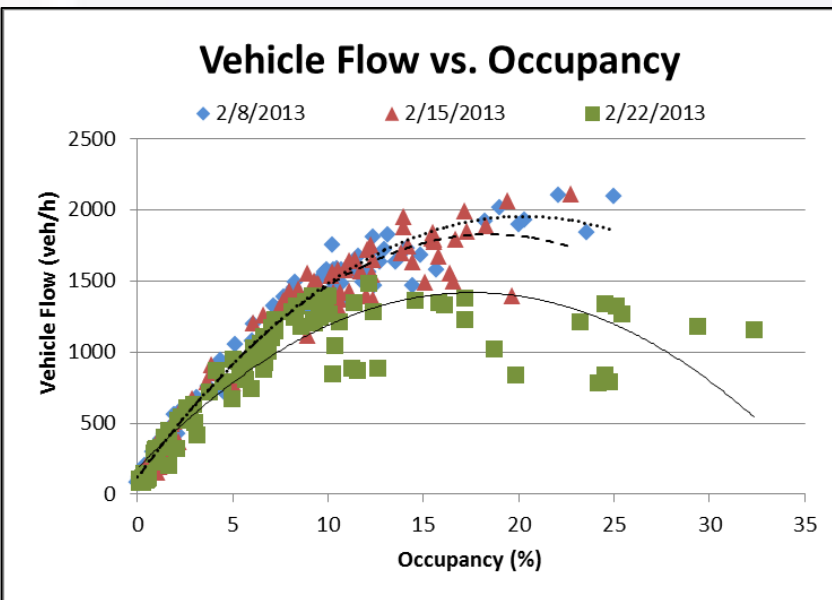
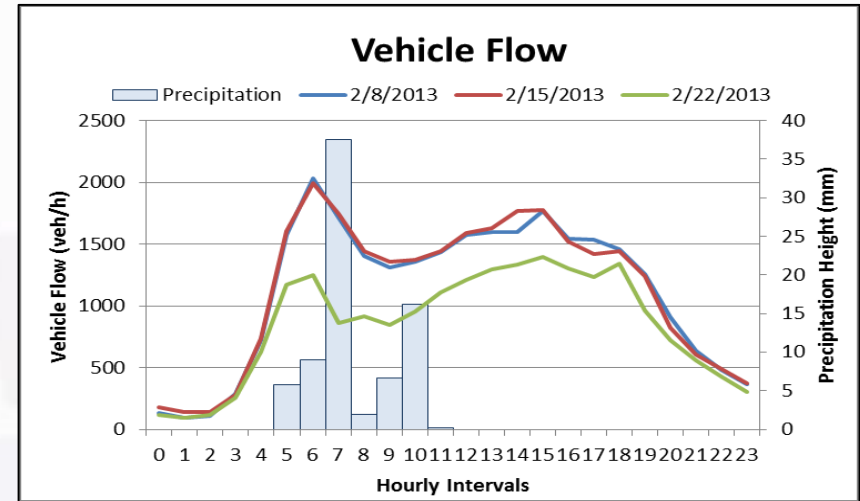
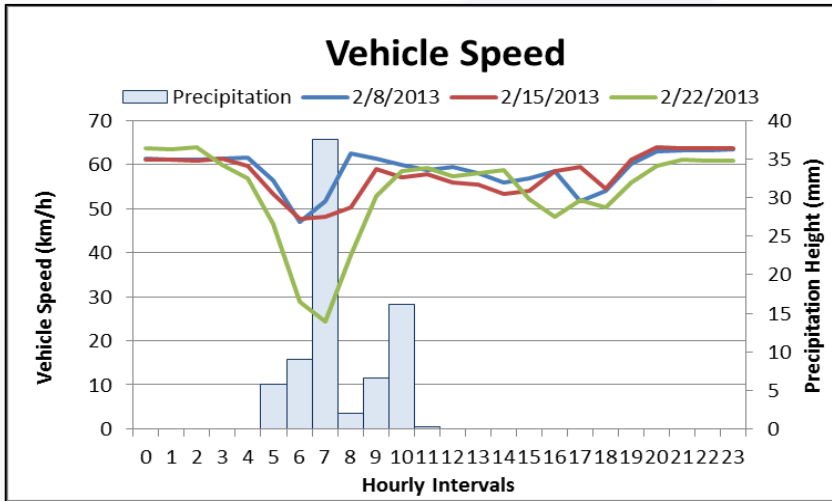
However

- Fog, precipitation, snow affect efficiency and safety
- Sunny days cause travel demand fluctuations

Forecast accuracy

Transportation and weather

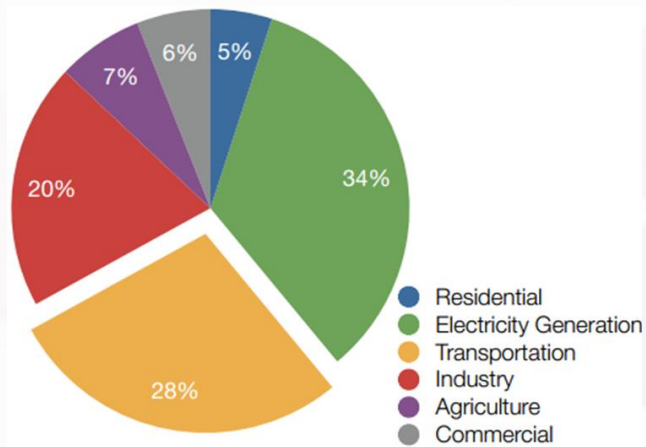
A well established relationship



Transportation and climate change

A well established relationship

- Transportation contributes to climate change
- Climate change affects transportation



Sources of GHG Emissions

HEI Panel on the Health Effects of Traffic-Related Air Pollution. 2010. Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects. HEI Special Report 17. Health Effects Institute, Boston, MA.

Flooding in Canada, 2013



Disaster Management and Weather

A well established relationship

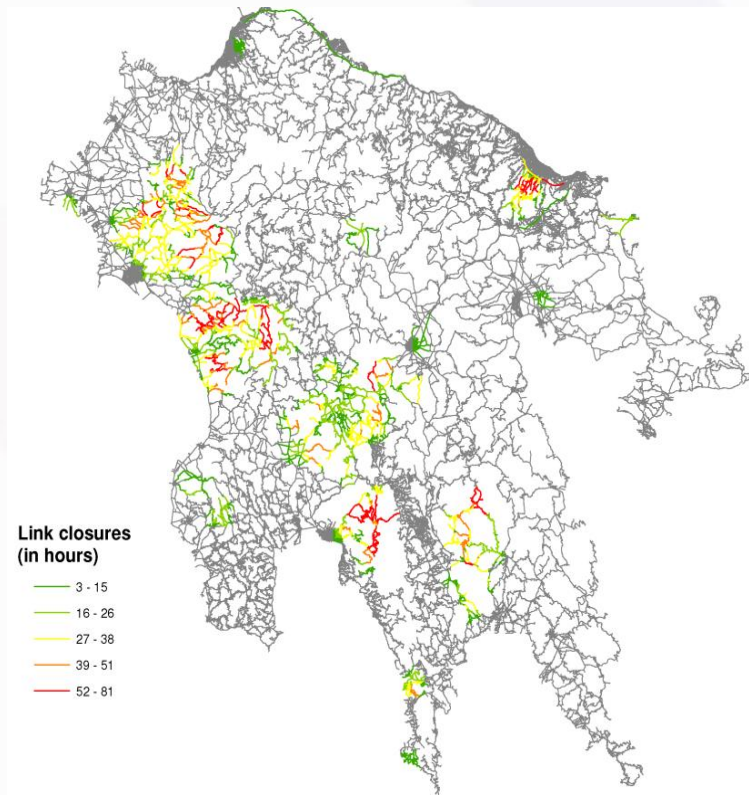
- Experiences based on DECIDE project
- Situational awareness is key to disaster management
- Case specific data is required
- Forecast is crucial in disaster management



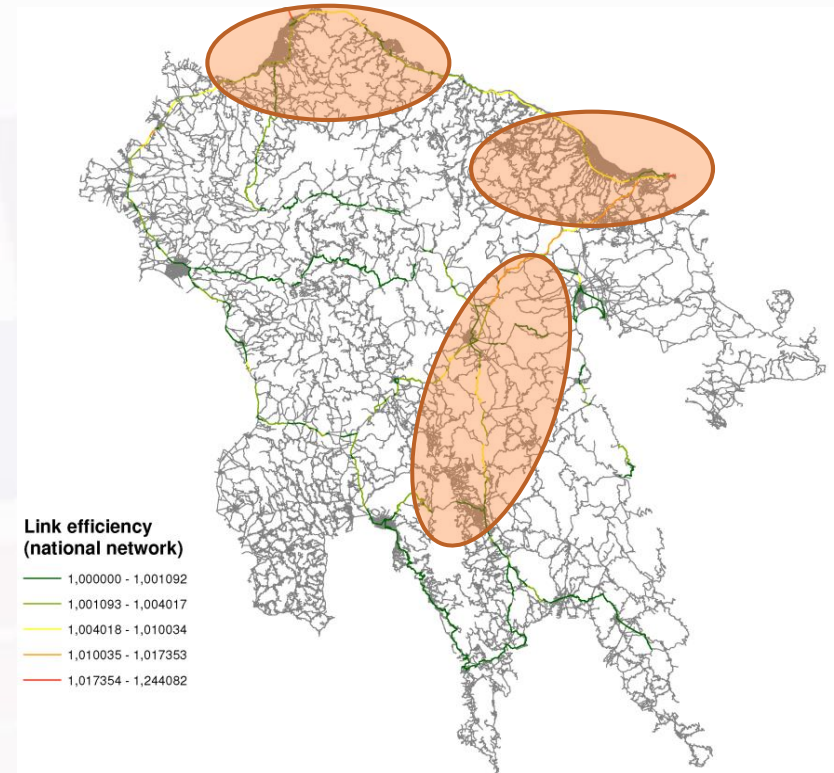
Disaster Management and Weather

A well established relationship

- Application on the Peloponnese 2007 wildfires



Closed network links during the
2007 wildfires



National network - Critical links (that
have to remain operational under any
conditions)

Future Challenges and Research Lines

- “Collective models”
- Disaggregated data
- Synergies and data sharing
- Clustering of expertise
- Development of an Open Data Portal
- Utilization of big data analytics
- International cooperation
- Utilization of open data for advanced modeling



Literature

- *Road transport induced GHG emissions calculation for urban transportation networks; the case of Athens and Thessaloniki in Greece, Christos Samaras, Iraklis Stamos, Leonidas Ntziachristos, Evangelos Mitsakis, Zisis Samaras, Georgia Aifantopoulou*
- I. Vouitsis, S. Amanatidis, L. Ntziachristos, A. Kelesis, M. Petrakakis, I. Stamos, E. Mitsakis, Z. Samaras (2015) Daily and seasonal variation of traffic related aerosol pollution in Thessaloniki, Greece, during the financial crisis, Atmospheric Environment.
- M. Diakakis, E. Lekkas, I. Stamos, E. Mitsakis (2015) Vulnerability of transport infrastructure to extreme weather events in small rural catchments, European Journal of Transport and Infrastructure Research.
- I. Stamos, E. Mitsakis, J.M. Salanova Grau (2015) Roadmaps for adaptation measures of transportation to climate change, Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies.
- I. Stamos, E. Mitsakis, J.M. Salanova Grau, G. Aifadopoulou (2015) Impact assessment of extreme weather events on transport networks: A data-driven approach, Transportation Research Part D: Transport and Environment.
- E. Mitsakis, I. Stamos, A. Papanikolaou, G. Aifadopoulou, H. Kontoes (2013) Assessment of climate change impacts and extreme weather events on transport networks: Case study of the 2007 wildfires in Peloponnesus, Natural Hazards

Thank you for your attention

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