# Climate change policy making under uncertainty: extreme events and public health

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Climate change is impacting the world at an unprecedented rate. Abrupt changes in the environment have irreversible impacts not only on the natural systems but also on the human systems and societies. Irregular drought or flood, intensified heatwaves, global epidemics, and changes in mortality and morbidity associated to communicable or non-communicable diseases are some of the major public health problems associated with climate change. We study climate policy in the presence of potential public health crises as a result of climate related extreme events. We develop a theoretical framework to incorporate the impacts of extreme events on labor productivity through increase in morbidity and mortality. We quantify the climate change induced health damages in a well-known integrated assessment modeling framework and present the optimal policy options under uncertainty about extreme events.

Keywords: climate change, public health, uncertainty, extreme events

 

# The Correlation of Urban Climate and Dengue: Metro Manila and Bandung Cases

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Dengue fever is a rapidly emerging mosquito-borne viral disease in tropical and subtropical urban cities. A growing evidence base demonstrates the causal link between climate-driven factors and dengue edpiemiology. A general hypothesis tested by environmental epidemiologists is that urban climate such as temperature and precipitation affect the mosquito vector’s biology and ecology therefore, increasing the risk of dengue transmission. The main objective of this study was to associate the spatial and temporal variations among three eco-edpiemiological elements; namely, local dengue incidence, mosquito abundance, and climate factors using observation data in Metro Manila, Philippines and Bandung, Indonesia. Results of the spatial analysis showed high predictive power of local flood and land use parameters in modeling the spatial variation of dengue incidence. Temporal correlation analysis using time series data demonstrated the lag effects of climate parameters and El Niño-Southern Oscillation index on the increase of dengue cases. The findings can be applied to predict future dengue risk under global climate change, and thus to implement proper adaptation for dengue control.

Keywords: Dengue, climate change, epidemiology

 

# The 2015 heat wave in Central Europe: meteorological factors and mortality impacts

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The 2015 summer was the warmest summer ever observed in Central Europe according to heat wave severity. We evaluate its climatological characteristics and study in detail the most severe and persistent heat wave that lasted for almost two weeks in the first half of August 2015. By analysing severity and duration of past major heat waves in the E-OBS data (since 1950) and examining their meteorological factors (atmospheric circulation, precipitation, net short-wave radiation, and soil moisture), we show that both favourable and persistent circulation conditions and soil moisture deficits contribute to development of major heat waves. In the following step, we evaluate the simulation of major heat waves in Central Europe and their links to the meteorological factors in historical runs of EURO-CORDEX regional climate models (RCMs). We discuss characteristics of atmospheric circulation, net short-wave radiation and soil moisture (characterized by precipitation deficits and evaporative fraction) during and before these events, and differences between the observed and RCM-simulated major heat waves. We show that underestimation of the frequency and severity of these events in RCMs is related to too high values of evaporative fraction, underestimated net short-wave radiation and overestimated precipitation, while severity of major heat waves is overestimated in those RCMs that simulate too dry soil and stronger easterly flow. The results highlight the importance of atmospheric circulation and land-atmosphere coupling for realistic simulation of major heat waves in climate models. In the last part of the study, we show that human mortality impacts of the 2015 heat wave in the population of the Czech Republic were similar to previous major heat waves (e.g. in 1994), which suggests that declining trends in heat-related mortality, reported in many parts of the developed world over recent decades, may be associated primarily to ‘average’ heat waves. Major events such as the 2015 heat wave in Central Europe still remain the deadliest weather-related disasters in mid-latitudes as to the overall number of fatalities.

Keywords: heat wave, climate variability, atmospheric circulation, land-atmosphere coupling, human mortality

 

# FUTURE EARTH HEALTH KNOWLEDGE-ACTION NETWORK

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Future Earth has been developing about ten Knowledge-Action Networks (KANs) as practical vehicles for active collaboration across scientific disciplines and between science communities and their partners in the society. Future Earth Health KAN is one of them. Its visions are to support and promote solution-driven transdisciplinary researches with stakeholders, to provide better understanding of the links between health and the environment, and to lead to integrated solutions for human health and environmental sustainability. Following a scoping workshop held in Bellagio, Italy in July, 2016, a Development Team (DT) was formed for actualize preparatory steps. By DT members with diverse backgrounds and co-chaired by Professors Andy Haines and Peter Daszak, initial implementation items and strategic actions have been identified and are followed through monthly web calls. In order to explore further broader communities to engage, Advisory Group was established recently, with Professor Oyun Sanjaasuren as the Chair. The members of those groups are open in the Future Earth website (http://www.futureearth.org/future-earth-health) together with key working documents. Health KAN welcomes active participation from research and professional communities, users of health and environment sciences, early career people, and anyone who has interests, via Open Network (http://www.futureearth.org/future-earth-open-network) and other opportunities.

Keywords: Future Earth, Knowledge-Action Network, Health

 