Can energy efficiency/saving in buildings be achieved through managed urban forms?

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Summary
Controlling urban developments and protecting natural habitats are two major challenges for urban planners. In addition to that, mitigating urban heat islands (UHI) and reducing energy consumptions in particular in buildings are becoming vital in cities to alleviate impacts of climate change. This relates strongly (but not exclusively) to the question of urban forms and locations of new accommodation in cities. Having this in mind, the impacts of two urban development scenarios of increasing intensity of control on urban development on UHI and energy demands in buildings for space heating were assessed in the Strasbourg-Kehl urban region (France -Germany). To that aim, the advanced urban growth model SLEUTH* (Houet et al., 2016) was coupled with the Weather Research and Forecasting model (WRF) and its urban parameterization (Skamarock et al., 2008). Two other computing programs, MorphoLim (Tannier et al., 2011) and Graphab (Foltête et al., 2012), were additionally applied to integrate realistic planning policies in the urban development simulations. Simulated urban development scenarios for the year 2030 show slight effects of realistic urban sprawl countermeasures on UHI intensities and energy demands in buildings. Results also suggest that further case studies and developments of the WRF urban meteorological model will be necessary to conclude on the impact of urban forms on energy demands in buildings for space heating.

About the speaker
Dr. Manon Kohler is a post-doctoral research fellow at the Leibniz Institute of Urban Ecology IOER (Germany). There, she is investigating the complex interactions between urban forms, urban climate, and energy use in buildings for space heating/cooling. Due to that, she developed a strong interest in human thermal comfort, a new topic which she is willing to develop in future. She completed her PhD in Geography at Université de Strasbourg in June 2015 on capacities of urban meteorological modelling systems to assess space heating energy demands in buildings and provide urban planning guidelines for smart cities. From her former works, Manon also developed an expertise in advanced urban development modelling from ThéMA laboratory (CNRS-UMR 6049, Besançon, France) and is actively collaborating with the climatology research center of the Biogéosciences laboratory (CNRS-UMR 5080, Dijon, France).