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Should Climatologists and Spatial Planners Interact? Weather regulation as an ecosystem service to be considered in the land-use planning field.

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In the last decade, climate considerations have received increasing attention from urban designers and land-use planners. Because of legal binding requirements and/or a growing awareness regarding climate change, scholars and practitioners have already started to think about urban designs and land-use patterns that may contribute to face the climate change challenge. (e.g. Bulkeley, 2006; Shaw et al., 2007; Davoudi et al., 2009) The thorough analysis of spatial planning documents – e.g. SCoT (Schéma de Cohérence Territoriale) adopted in the Île-de-France Region (i.e. Paris region) - we have made and will report on has revealed the two main ways through which climate change action is thought about and for which measures are encouraged at the territorial level:

1. via mitigation strategy, i.e. solutions to either limit atmospheric greenhouse gases emissions or to capture them (e.g. urban structures that aim at limiting transportation-related emissions by promoting compact settlements, bioclimatic principles in urban and architectural designs that aim at reducing energetic consumption). Such solutions will in fine affect the global level of CO_2 in the atmosphere, and thereby contribute to limit global warming. Local/regional effects may however not be felt by citizens and decision makers as they depend on the magnitude of the changes at the global scale;
2. via adaptation strategy, i.e. solutions to cope with adverse local/regional consequences of climate change. The global climate in this case is seen as a driver of local changes. Actions will be undertaken to moderate negative impacts of global climate change, potentially at costs, by reducing the vulnerability of local human communities and biological ecosystems on the concerned area (e.g. flood prevention systems, countermeasures to urban heat islands).

We can wonder whether this traditional way of approaching the climate change action, based on a double mitigation-adaptation strategy, does not restrain the scope of solutions to be considered in the spatial planning field. Regional meteorology/climatology has demonstrated over the past decades that changes in land-uses and/or land cover may have substantial impacts on a) mean regional/local climate (Lobell & Bonfils, 2008), b) the magnitude and duration of extreme events (e.g. Marshall et al., 2004, Davin et al., 2014), c) air quality and therefore human's and ecosystems' health (e.g. Corchnoy et al. 1992, Hewitt et al., 2009). Such studies support the hypothesis that a careful regional climate modelling may help to refine the global climate projections and assess the local benefits or drawbacks of various land use/land cover policies.

There is however a lack of studies at such spatial scales (from local to regional) to carefully quantify the impacts realistic land scenarios may have on atmospheric conditions (e.g. temperature, humidity, air quality, winds, incoming radiation). We have started to think about ways to evaluate those at the French national scale. That implies the choice of ad-hoc models, scenarios, data for evaluation, ... that we will discuss. Our proposal is that in fine the regulation of the atmospheric boundary layer (where we live) may be considered as a service that land uses/cover/management may impact and that we need to study as much as other ecosystem services are.

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