

“The terrestrial nitrogen cycle and climate change”

Xiaotang JU

College of Resources and Environmental Sciences, China Agricultural University, Beijing

Nitrogen cycle is an important component in the global biogeochemical cycle. Anthropogenic activities have substantially raised the level of reactive N (Nr) in the atmosphere, which have caused various environmental problems at local, regional and global scales. Such dramatic increases of Nr can aggravate the impacts on the balance of climate forces in many ways, either through changes to the atmospheric constituents, or through feedbacks within the terrestrial ecosystem. For example, N₂O emission directly contributes to the global warming and ozone depletion; NO_x compounds indirectly produce the short-lived climate-forcing agents (e.g. ozone, aerosol particles) and remove the long-lived climate-forcing agents (e.g. methane); NH₃ also increases the formation of aerosols. On the other hand, N deposition into the terrestrial ecosystem would have impacts on the carbon exchange and the greenhouse gas (GHG) fluxes between land and atmosphere. There are many interactions and feedbacks between the N cycle and the climate forces, which is likely to vary across regions.

In this presentation, I will firstly review the sources, fluxes and benefits of global N cycling; and secondly, comprehensively review the complex impacts of Nr on climate system and the increasingly more inclusive approaches. Thirdly I will summarize the integrated assessment of Nr on climate at the regional or national level and taking United States, European Union and China as the case studies, as well as at global scale. The integrated assessment method combines the direct and indirect links between Nr and climate, is better positioned to assess regional or national contributions to global climate change and put forward the mitigation and adaptation ways.