Title: Modeling the Earth system: from process-level to climate impacts

Speaker: Kostas Tsigaridis, Research Scientist, Center for Climate Systems Research, Columbia University, NASA Goddard Institute for Space Studies

Abstract: Understanding the climate of the past, its present state, and project how it would change in the future, is a very complex task. Natural variability, together with fast-changing anthropogenic activities, make the biosphere respond in different ways as time progresses. Earth system models are our best tools to help us understand the coupling between the atmosphere, the land and the ocean, and enable us to quantify how climate will both govern and respond to atmospheric composition changes. Atmospheric aerosols are a very important element in this perspective. Measurements and modeling are continuously adding information to our understanding on their role on climate, confirming their ever-changing spatiotemporal distribution and properties, which deems them a very challenging subject.

In this talk I will be presenting why aerosols are important at the interfaces of the atmosphere, the ocean, and land, and demonstrate their complicated role in the Earth system, and, ultimately, on climate. The focus will be on the role fundamental individual processes play on aerosol occurrence and interaction with radiation and clouds, e.g. how gas-phase chemistry affects aerosol formation, how aerosol volatility impacts the spatial distribution of aerosols, how aerosol changes result in a different climate response, and how climate change alters aerosol sources and distribution. I will also discuss the role of the biosphere as a source of aerosols, and the role of aerosols as a source of nutrients in the biosphere, in a changing climate. I will finally demonstrate how climate models use measurements of all kinds, from in-situ surface and suborbital data to remote sensing retrievals, in order to evaluate and improve models.

Hosts: Ulas Im and Gitte Brandt Hedegaard on behalf of iClimate (Interdisciplinary Centre for Climate Change)

External Guests interested in attending the presentation should e-mail Christel Ege-Johansen, Department Secretary, cej@envs.au.dk