SORS: Freshwater salinization: a global challenge in need of data science solutions

Abstract

All around the world humans are increasing the salt concentrations of freshwater ecosystems (rivers, lakes, wetlands, etc.) through a wide variety of activities such as agriculture or resource extraction. This phenomenon, known as freshwater salinization (FS), threatens aquatic ecosystems, limits socioeconomic activities, and impacts human well-being. Overall FS reduces biodiversity, alters river ecosystems and poses a risk to water availability, food security and human health. For a long time FS has been neglected by water managers and society at large, but recent ecological disasters (e.g. the Oder River disaster) have served as a wake up call. Now, more and more institutions (from the European Commission to the United Nations) are recognizing the important of addressing FS. However, we are still far from understanding how FS is caused and which regions of the world are at highest risk. This lack of knowledge limits effective management strategies and results in substantial socioeconomic losses. Within this context, artificial intelligence (AI), especially Deep Learning and advanced computing, can play a crucial role because they allow analyzing geospatial data at high spatial and temporal scales to unravel complex interactions between multiple factors (e.g. climate, anthropogenic drivers, etc.). In this talk I will present the challenge, the availability of data to address it and possible ways of moving forward by combining ecology with data science.

Short Bio

Miguel Cañedo-Argüelles is an ecologist working to assess the impact of human activities on aquatic biodiversity and ecosystem functioning using a wide variety of methods (e.g. biomarkers, ecological modelling, geographical information systems, ecological traits) and combining laboratory/mesocosm experiments with field studies. His research includes multiple levels of organisation. For example, how anthropogenic stressors and natural disturbances affect populations and communities of aquatic organisms and how this is translated into changes in ecosystem functioning and the delivery of ecosystem services. Also, he has addressed spatiotemporal dynamics by studying how organisms' dispersal and the landscape configuration determine the exchange of species among communities and by analysing long-term and paleolimnological data.

Speakers

Speaker: Miguel Cañedo-Argüelles, ecologist and leading researcher at IDAEA-CSIC.
Host: Francisco J. Doblas Reyes, BSC Earth Sciences Department Director, BSC Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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