Title: Landscape change in the north western mangrove of Madagascar: the role of sustainable fisheries for local communities' livelihoods

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Session: Landscape Change and Sustainable Development: The Case of Madagascar

Abstract: Mangrove ecosystems show higher social, economic and ecological values among forest ecosystems due to its localization in the coast. However, ecologic, economic, human factors and global change involved simultaneously have serious impact in this kind of ecosystem while direct contributions assessment are still less investigated. In addition, lack of study demonstrated integration of ecosystem services value to natural resources dynamic. In this sense, this research is focused on mangrove change and crab market importance as drivers of change in two observed bays (Bombetoka and Mahajamba). The study include crab stock estimation, local livelihoods involvement and landscape analysis. Landscape analysis includes mangrove landscape mapping from remotely sensed data especially Landsat data while classification has been implemented and compared (2005, 2010 and 2015). The results emphasize the importance of degradation between the two observed bays. Mahajamba bay shows a weak degradation while Bombetoka bay show an advanced degradation and deforestation. Since 2010, the integration of crab market have changed mangrove landscape trend. The emergence of crab market have significantly reduced mangrove deforestation and degradation in the Bombetoka bay and prevented deforestation in Mahajamba bay. Importantly, the study highlights contributions of natural resources economic value to local livelihoods system which affect landscape change prevention. In order to model mangrove dynamic integrating ecosystem services value, an upscale of the study at national scale should be conducted including other parameters.

Presenter: Raya Rey, Andrea N

Title: A telecoupling analysis for the Patagonian Shelf seascape: A suggested template on how to study the wider seabirds-fisheries interactions worldwide for sustainability

Authors: Andrea N Raya Rey (CADIC-CONICET);Falk Huettmann (EWHALE lab, Inst of Arctic Biology, Biology & Wildlife Dept. University of Alaska Fairbanks);

Session: Landscape networks as telecoupled human and natural systems

Abstract: The Southwest Atlantic Ocean and the extended Patagonian shelf in particular, is a highly productive seascape. It is a very complex ecosystem of global relevance and maintains a great diversity and abundance of seabirds and marine mammals, too. Fisheries have been identified as a main stressor for the marine ecosystems and as the main cause of seabird population declines. Using the framework of telecoupling - the sophisticated natural and socioeconomic interactions over wider distances - we present a fresh look at the dynamic fisheries and (endangered) seabird interactions for the Patagonian Shelf seascape. We found that these waters are affected by many nations and players, inside and outside. Here we show how the input, output and spill-over of the Patagonian shelf ecosystem are distributed almost globally. In addition, we also show 'losers' (=nations that are left out entirely from this global resource and its governance). Our findings are based on best available public trade and harvest analysis for this region, linked with predictive modeling (machine learning and some open source geographic information systems GIS) for nine seabird species. We extend this analysis with a perspective from the financial sector and ethical banking policy that support the Patagonian fisheries as international investment projects. As increasingly recognized elsewhere, we believe that telecoupling can serve as a new but rather sophisticated study template for an improved more holistic conservation research on oceans and global sustainability questions.

Presenter: Raya Rey, Andrea N

Title: Prediction of ten seabird species of the Patagonian Shelf: Digital baseline with open access machine learning for a more effective seascape management

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Session: Machine Learning and Data Mining Applications in Land- and Seascape Ecology: What it is, Why it matters, and Where the Progress Still Sits

Abstract: Quantitative knowledge about the spatial distribution of seabirds at sea is relevant for conservation. The Southwest Atlantic Ocean and the extended Patagonian shelf in particular, is a highly productive seascape. It is a very complex ecosystem of global relevance (i.e. fisheries, climate regulation) and maintains a great diversity and abundance of marine life. Direct and indirect discharge of chemical pollutants, industrial and expanded cities pollution, by-catch, entanglement, climate change and alien species pose severe threats for seabird populations in the Patagonian shelf. Nevertheless seabird at sea distribution is missing for most species and even less open access efforts. Based on the data mining and machine learning TreeNet (boosting) algorithm, and 10 environmental publicly available Open Source Geographic Information Systems (GIS) layers, we built for the first time 10 predictive seabird models for the Patagonian shelf based on public open access data archives such as the Global Biodiversity