

## **Satellite-derived NDVI outperformed temperature acceleration for predicting the timing of geese spring migration**

**Mitra Shariatinajabadi (attending), Roshanak Darvishzadeh, Andrew K. Skidmore, Andrea Kölzsch, Anton Vrieling, Albertus G. Toxopeus, Klaus-Michael Exo, Nirvana Meratnia, Paul Havinga, Julia Stahl and Bart A. Nolet**

Email: [m.shariatinajabadi@utwente.nl](mailto:m.shariatinajabadi@utwente.nl)

The green wave hypothesis predicts that herbivorous waterfowl will follow the flush of spring growth of forage plants along stopover sites during their spring migration. Satellite-derived NDVI time series (here referred to as satellite-derived green wave index or GWI) yield reasonable estimates of biomass, and has been widely adopted as a proxy for plant phenology in ecological studies. An alternative parameter that may be used to evaluate the green wave hypothesis is the rate of change in temperature acceleration (GDDjerk) that could be a proxy for the onset of spring. The GWI may be more directly related to the vegetation phenology than GDDjerk; however these two indices have never been compared for timing prediction of the herbivore waterfowl with respect to the green wave phenology. Here, we calculated the GWI from MODIS NDVI time series imagery and GDDjerk from gridded temperature data using GLDAS re-analysis products. To predict the timing of arrival at each stopover site, four years (2008-2011) of tracking data from 12 GPS-tagged barnacle geese were used. The geese arrival at the stopover sites was predicted more accurately using GWI ( $R^2=0.67$ ,  $\text{RMSD}=4.75$ ) than GDDjerk ( $R^2=0.53$ ,  $\text{RMSD}=5.74$ ). The result demonstrated that the GWI is a more accurate index for predicting geese migration timing.

## **Winter-flooded rice fields – the last refuge for Crested Ibis – are facing an unexpected decline**

**Yiwen Sun, Tiejun Wang and Andrew K. Skidmore (University of Twente)**

Email: [y.sun@utwente.nl](mailto:y.sun@utwente.nl)

Traditional agriculture benefits a rich diversity of plants and animals. The winter-flooded rice fields in the Qinling Mountains, China are the last refuge for the endangered Crested Ibis, and intensive efforts have been made to conserve and restore this unique anthropogenic habitat. Analyses of multi-temporal satellite data indicate that winter-flooded rice fields have been continuously reduced and fragmented in both the core-protected areas and non-protected areas during the past two decades. The rate of loss of these fields in the core areas has unexpectedly increased to a higher level than that in non-protected areas in the past decades, and the habitats in the non-protected areas have become even more fragmented. Our findings suggest that traditional agriculture in China is threatened by socio-economic and demographic changes, which may carry great risks for the long-term survival and recovery of threatened species, like the Crested Ibis, that rely on these anthropogenic habitats.

## **Mapping connectivity for a critical endangered endemic primate: San Martín titi monkey (*Callicebus oenanthe*)**

**Jennifer Swenson (attending), Duke University; Danica Schaffer-Smith and Antonio J. Bóveda-Penalba**

Email: [jswenson@duke.edu](mailto:jswenson@duke.edu)

Locally known as the “Tocón”, the critically endangered San Martín titi monkey (*Callicebus oenanthe*) has one of the smallest geographic ranges of Peruvian primates. Its range has been severely impacted by land conversion for intensive agriculture, human settlements and mining. We have mapped remaining habitat using Aster (15m) multi-spectral data with the RandomForest algorithm to identify patches of primary and secondary forest. We also used historic Landsat data to identify forests previously disturbed since the 1980s. We then identify and prioritize the most important remaining habitat to preserve and/or restore based on habitat condition, landscape metrics, ownership and contribution to connectivity. A local non-profit, Proyecto Mono Tocón, has worked to better understand the Tocón’s habitat occupancy and requirements and to acquire land to protect against active deforestation. We have designed our work to link directly with the goals of Proyecto Mono Tocón for the preservation of this species.