Leslie Comrie Seminar Series 2023/24

Wednesday 24 April 2024, 15:00-16:00

A new improved model for predicting the level of chlorophyll-a in the oceans using satellite imaging

Speakers: Professor Dimitrios Stasinopoulos and Professor Robert Rigby, University of Greenwich

Abstract:

The detection of the level of chlorophyll-a in the oceans using satellite imaging is a very important tool for monitoring phytoplankton abundance, eutrophication status and the risk of harmful algae blooms. A new methodology is introduced, which outperforms the current NASA methodology. This new methodology is based on Generalized Additive Models for Location, Scale, and Shape (GAMLSS).

In this talk, we will introduce the GAMLSS methodology and explain its application to predicting the level of chlorophyll-a in the oceans using satellite imaging. The model uses the intensities of different colour bandwidths (obtained from the satellite imaging) to obtain a predicted distribution of the level of chlorophyll-a in each satellite pixel, producing a global map of chlorophyll-a in the oceans.

Our analysis was published recently in the "Journal of Photogrammetry and Remote Sensing":
A novel algorithm for ocean chlorophyll-a concentration using MODIS Aqua data
https://www.sciencedirect.com/science/article/pii/S0924271624000868

We will also discuss the appropriate usage and the advantages of GAMLSS over other statistical and machine learning techniques.

Bio
Professors Robert Rigby and Mikis Stasinopoulos are world leading experts in Distributional Regression, with extensive publications including a Read Paper to the UK Royal Statistical Society (which has over 3000 citations in google scholar) , three books, and two 4* World Leading Impact cases studies in the REF2021.

They developed the GAMLSS model, which is used worldwide for distributional regression, and includes the "state of the art" method of centile estimation used by the World Health Organization amongst many others.