

## **Increasing deforestation in Amazonia and its effects on the forest carbon dynamics**

Paulo Artaxo

Peat-fire is a complex phenomenon with various possible causal factors, involving numbers of processes from hydrological, extreme weather conditions, ecological as well as social-economic and cultural. Thus, management decision for managing peat-fire should be equipped with understanding all of those factors and processes. Unfortunately, the existing body of knowledge does not provide any decision support tool for peat fire management, involving those complex systems. Individual/ Agent – Based Model (IBM/ABM) is an emerging scientific and management approach which able to reveal complex phenomena using bottom-up mechanistic processes and capable of providing various management options for dealing with peat-fire in Indonesia. The objective of this project is to investigate the best-suit management options for a protected area in South Sumatra Province of Indonesia to manage the threat of peat-fire occurrences under weather uncertainties. This ongoing study develops the PeatFire model using NetLogo ver 6.0. involving three main agents, i.e., patches, households, and fire entities. Each agent behaves uniquely according to their state variable, environment, and interaction between agents. The parameterization of the model use existing spatial and non-spatial (e.g. water table data, hidrology, as well as weather data, and etc.). We use MODIS data from 2001 to 2015 for model validation. Our first version of PeatFire showed a similar pattern with current peat fire in 2015. We discuss possible improvement of the model for simulation previous fire patterns and future prediction. We also develop various scenarios including extreme weather conditions for predicting the face of protected areas in the peatland of Sumatra.