



## **Broadening the use of hazard early warning approaches to inform planning on climate change timescales: case study on developing early warning systems for Amazon forest health**

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Early warning systems are routinely considered in the context of operational meteorology. Here, we utilise some of the approaches used to develop such systems and apply them to longer timescales. Specifically we consider the development of early warning systems for informing on Amazon forest health under current and future projected climate.

The Amazon forest is an important source of resources such as timber and crops, and provides essential ecosystem services, such as its role as a globally significant store of carbon. It is therefore important to understand how climate can affect the health of the Amazon forest, and develop plans to identify when climate changes may lead to significant degradation in this system. We present some of the results from the EU FP7 project AMAZALERT. We identify indicators of forest health and associated climate regime for the Amazon region and assess where thresholds may exist in the behaviour of the forest vegetation. We use direct and proxy indicators of plant growth and physical climate variables, from gridded observations and the CMIP5 archive of climate model diagnostics. We compare observed and modelled parameters to assess the extent of model biases in different indicators. Using composited data, characterised by low or high precipitation, we attempt to find a spatial signature in each indicator for dry or wet years and aim to highlight thresholds in particular climate regimes. The future aim is that these thresholds be utilised within a multi-hazard framework to develop early warning systems relating climate variability and change to changes in forest health.

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