Project Database of ICP Forests

PROJECT DESCRIPTION

PROJECT INFORMATION

Project title:	Can satellite-based weather index insurance hedge the risk of mortality or the survival probability of trees?
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Due to rising temperatures, forest stands are increasingly exposed to drought stress, which affects the productivity of forests by higher mortality rates. However, the majority of forest owners do not insure their forests because insurance premiums are very high and the insurance incentive is often lacking, as public compensation is often paid in the event of damage. Against this background, satellite-based weather index insurance could be an option for the existing problems in the forest insurance sector and a possibility to hedge the mortality risk of standing timber. Therefore, we calculated three remotely-sensed vegetation health indices from MODerate-resolution Imaging Spectroradiometer (MODIS) satellite images. As indices for weather index insurance we use the Vegetation Condition Index (VCI), the Temperature Condition Index (TCI) and the Vegetation Health Index (VHI). We also generate temperature and precipitation sums as benchmark indices. As a proxy for the economic damage, we use crown condition data to derive the mortality or survival probability of forest stands. For forest stands in Germany, we first examine the index calculation periods with the highest correlation to the mortality rate. In a second step, we calculate the hedging effectiveness for hypothetically designed index insurance contracts based on satellite and meteorological indices. Thus, satellite-based weather index insurance can assess the mortality risk of standing timber und thus could help to reduce the high insurance premiums in the forestry sector.