

# **Study Of the Development of Extreme Events over Permafrost areas - SODEEP**

## **Objectives.**

We will examine the impact of climate change on the permafrost degradation and related biophysical feedbacks over various spatial and temporal scales. Our aim is to assess the role of land-atmosphere interactions on the severity and frequency of extreme events over circum-Arctic land areas. Our focus regions are major bio-climatic zones of the Russian Arctic and sub-Arctic, which are not only extremely vulnerable habitats to the permafrost degradation due to climate change, but also exhibit a threat for the global climate due to frozen soil-bounded carbon.

## **Innovativeness.**

We will bring together data from long-term in situ observations and field studies as well as medium and high-resolution satellite-borne and aerial observations with state of the art hierarchy of numerical models both in global and regional climate simulations as well as the permafrost standalone model.

## **Progress beyond the state-of-the-art.**

Novel techniques for interpretation of remote sensing imagery as well as a permafrost temperature dynamics and active layer thickness database will be developed. This will allow identifying missing or misrepresented permafrost-relevant key processes in numerical models providing adequate, potentially scale-dependent representations of these processes. This will enable us to investigate the future impact of extreme events on permafrost areas and to better understand how the development of these extreme events is influenced by land-atmosphere interactions.

## **Methodology.**

**WP1.** Development of an integrated remote sensing methodology to process and interpret satellite imagery and aerial photography and establishing a permafrost dynamics database.

**WP2.** Specification of optimal permafrost parameterizations for the modelling and production of high- resolution permafrost (~1km) maps.

**WP3.** Identification of key processes which determine the generation of extreme events.

**WP4.** Changes in extreme events and their impact on permafrost areas.