



Project acronym: BOREALFIRE

Project title: Fire history reconstruction of Siberian boreal forests through dendrochronology: interacting effects of climate and ecohydrological conditions

Project leader: Tatiana Shestakova, Woods Hole Research Center, United States

Discipline: Earth Sciences & Environment: Other - Environment

Station(s): Kajbasovo Research Station (Russia)

Boreal forests are the largest reservoir of terrestrial carbon (C), thus contributing significantly to the regulation of the global C cycle. Climate warming is producing an intensification of the fire regime in these forests that may lead to irreversible changes in functioning, species composition and tree demography and, consequently, to substantial modifications of the terrestrial C budget. Notably, this amplification has been observed not only in dry forests but also in wetlands, for example the extensive boggy areas of Western Siberia. To understand how temperature and precipitation interact to control long-term fire activity in this region, we intend to characterize past fire history in conifer forests developing under contrasting ecohydrological conditions, in particular those related to peat (organic) soils and those associated to mineral soils. We will survey a number of forest stands (N = 8–12) growing in dry vs. waterlogged areas and either subjected to recent fires (back in 2000) or not near Kajbasovo Research Station (Western Siberia). Using dendrochronological approaches, we will infer long-term growth dynamics and past fire regimes of these forests. Also, we will identify the main external drivers of tree performance by characterizing growth patterns, which will allow differentiating responses to climate (e.g., warming) from those related to fire (e.g., growth suppression, release from competition). Results will provide valuable information on the ecological footprints of global warming on forest dynamics as related to fire disturbances. They will also contribute to raise scientific and societal awareness about anthropogenic impacts on boreal ecosystems.