The Past, Present and Future of Spasskaya Pad in Eastern Siberia, Russia

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1. Introduction

H_2O and CO_2 fluxes have been measured at Spasskaya Pad tower station near Yakutsk since 1998. This station belongs to the Institute of Biological Problems in the Cryolithozone, Russian Academy of Sciences (RAS). We introduce the international studies carried out in Spasskaya Pad, and report the recent operational problem and the tasks for the future.

2. Past and Present Status

GEWEX/GAME began in 1998, and this is the beginning of study in the Water, Energy, and Carbon (WEC) cycles in Spasskaya Pad. During this project the seasonal variation of many elements in the WEC cycles became clear, and international partnership among Japanese and Russian scientists, who are mainly hydrologists and meteorologists, has been tightened. CREST/WECNoF project followed by GEWEX/GAME promoted the collaboration with forest ecologists because the physiological and ecological functions of the forests were studied. We widened our themes on the WEC cycles from boreal forests to temperate forests, and the WEC cycles at forest ecosystems was explained with a concept of response on environmental conditions. In RIHN project, natural scientists and social scientists are challenged to collaborate in the study of WEC cycles, and the results of the WEC circulation and flood risks are reported. In ArCS project, the relationships between forest conditions and methane flux are now being studied among the WEC circulation.

3. Future Stage

Spasskaya Pad tower station plays a highly important role in elucidating the relationships between the WEC cycles and the boreal forest – permafrost symbiotic systems in eastern Siberia, observing the climate change of sub-Arctic area, and contributing to improvement in earth system science. The northeastern Eurasia is recognized worldwide as an observation domain of the climate environment change similar to north America – Canadian region, north European – western Russian region, and Greenland region. Japanese scientists have been playing a leading role in the observation in the northeastern Eurasia. In addition, the Spasskaya Pad tower station is uniquely located in the north side of the green belt, which consists of boreal, temperate, and tropical forests, expanding in eastern Asia in North-South direction as well as East-West direction. Because such a research platform has been operating for many years, the interaction studies corresponding to the hydrological and climatological changes are promoted more and more.

4. Tower Trouble

Multi-level observations using the tower in Spasskaya Pad was suspended since summer of 2017 due to the cracks found on the tower pole brace near the base for 3 years. It seems there lacks of sufficient strength for the 20-years old observation tower. Gaps in observation should be avoided especially under changing environment as recently observed. For example, the area of a pond in Spasskaya Pad has been the smallest due to small amount of rain in summer of 2017 and it is quite regrettable not to get meteorological and hydrological data in such a unique year. We are working on early restoration of the tower in a moment.

5. Conclusion

In this paper, the previous projects and their results using Spasskaya Pad tower station near Yakutsk are introduced, and the future plans are also presented. And the serious accident occurred in Spasskaya Pad in 2015 – 2017 is reported.