Analysis of hot summer in 2018

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Global averaged temperature in 2018 was considerably higher than normal year. Probably it is the fourth highest in the past. Especially, it was memorable that East Asia, Europe, and the southwestern part of the United States were hit by record heat waves in this summer. It is important for the ecological resilience to investigate how much such extreme weather damages the terrestrial ecosystem and how will it change after that. In this study, we analyzed the effect of this extremely high temperature on terrestrial vegetation using satellite remote sensing data. First, we investigated the high temperature area using MODIS land surface temperature (LST) product. Then, focusing on these high LST areas, we analyzed the impact to satellite observed Solar Induced Fluorescence (SIF) that closely related to a photosynthetic activity. As a result, it was found that the LST of 2018 in the East Asia (Japan, Korea and North Korea) was the highest during 2002 - 2018 years. And it also indicated abnormal high LST regions from Germany to northern Europe. Analysis of SIF data showed a positive decline in Europe but did not show a clear trend in Asia. In addition, similar trends were seen from other satellite vegetation indices, and it was found that the terrestrial vegetation shows different responses in both areas affected by the same hot summer.

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