EMS Annual Meeting Abstracts
Vol. 14, EMS2017-20, 2017

Historical changes in dry conditions in Indonesia

Vasily Kokorev (1,2), Peter Siegmund (1), and Janneke Ettema (2)

(1) KNMI, Information and Observation Technology R&D, Utrecht, The Netherlands, (2) Faculty of Geo-Information Science and Earth Observation, University of Twente, Enschede, The Netherlands

Indonesia often is not viewed as a drought-prone country, because of the tropical climate and a large amount of annual rainfall. However, Indonesian farmers report a more frequent occurrence of dry conditions in the last decades. In the literature, there were several attempts to detect and quantify these changes. There are very little changes in precipitation means, and there is an ongoing discussion regarding changes in the precipitation extremes. The observed changes usually are not statistically significant. Lack of data and high interannual variability of precipitation patterns are main factors behind the complexity of this problem. In this study, we investigate historical changes in frequencies of dry conditions and their relevance to agricultural applications.

We take advantage of the Southeast Asian Climate Assessment & Dataset (SACA&D), a state-of-the-art archive created by KNMI and containing daily data from 2885 meteorological stations. The vast amount of carefully collected and verified data allows us to mitigate the problem of insufficient data in assessing possible trends of precipitation extremes. We delineate regions with different precipitation regimes and coherent changes in precipitation extremes while paying specific attention to regions with high agricultural production and precipitation parameters affecting agriculture.

We use robust statistics to investigate historical and recent changes in dry conditions in Indonesia. Our findings show that while changes in means are small, there are significant shifts in the extremes characteristics. We observe longer dry periods and a delayed start of the dry season. We consider changes in dry conditions and take into account local agricultural calendars and conclude that more frequent occurrence of dry conditions often take place in a critical period of crop development and, therefore, potentially have a large impact.

We attempt to attribute the observed changes to dry conditions to climate change, specifically to changes in sea surface temperatures and global and regional circulation patterns. Connections to the changes in SST shows potential for seasonal predictions of extremely dry conditions.