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Towards Remotely Sensed Composite Global Drought Risk Modelling

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Abstract
Drought is a multi-faceted issue and requires a multi-faceted assessment. Droughts may have the origin on precipitation deficits, which sequentially and by considering different time and space scales may impact soil moisture, plant wilting, stream flow, wildfire, ground water levels, famine and social impacts. There is a need to monitor drought even at a global scale. Key variables for monitoring drought include climate data, soil moisture, stream flow, ground water, reservoir and lake levels, snow pack, short-medium-long range forecasts, vegetation health and fire danger. However, there is no single definition of drought and there are different drought indicators and indices even for each drought type. There are already four operational global drought risk monitoring systems, namely the U.S. Drought Monitor, the European Drought Observatory (EDO), the African and the Australian systems, respectively. These systems require further research to improve the level of accuracy, the time and space scales, to consider all types of drought and to achieve operational efficiency, eventually.
This paper attempts to contribute to the above mentioned objectives. Based on a similar general methodology, the multi-indicator approach is considered. This has resulted from previous research in the Mediterranean region, an agriculturally vulnerable region, using several drought indices separately, namely RDI and VHI. The proposed scheme attempts to consider different space scaling based on agroclimatic zoning through remotely sensed techniques and several indices. Needless to say, the agroclimatic potential of agricultural areas has to be assessed in order to achieve sustainable and efficient use of natural resources in combination with production maximization. Similarly, the time scale is also considered by addressing drought-related impacts affected by precipitation deficits on time scales ranging from a few days to a few months, such as non-irrigated agriculture, topsoil moisture, wildfire danger, range and pasture conditions and unregulated stream flows.

Keywords
Remote sensing; Composite Drought Indicators; Global Drought Risk Monitoring.