How can satellite data improve our knowledge on large wildfires?

Akli Benali, Ana Sá, José Miguel Cardoso Pereira

Following recent advances in remote sensing technology, there are currently several satellites that can be used to study individual wildfires. Those progresses are coincident with the growing recognition that it is critical to improve our knowledge regarding the spread of wildfires to improve our ability to predict their behavior and anticipate their consequences. However, information of the spread and behavior of large wildfires is still very limited and often subjective, limiting our understanding and our prediction capabilities. Within this context, the current constellation of available satellites can significantly contribute to fill this research gap, due to their synoptic capabilities, systematic monitoring and large spatial coverage. Here, we provide an overview of the recent advances on the study of individual wildfires using satellite thermal data, focusing on the potentialities and limitations of the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Visible Infrared Imaging Radiometer Suite (VIIRS). Satellite thermal data can provide a relevant contribution to: i) the estimation of fire dates and the location of their ignition(s); ii) study the overall fire spread patterns; iii) the evaluation of fire spread predictions ; iv) a better understanding of the impacts of data quality and model parameters on the accuracy of fire spread simulations; and ultimately v) to improve fire predictions. We also identify some of the important progresses that can be made over the next decade to improve our knowledge on individual wildfire properties and consequently enhance fire prediction capabilities, including the use of upcoming satellites