

HiTempo: a platform for time-series analysis of remote-sensing satellite data in a high-performance computing environment

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ABSTRACT

Course resolution earth observation satellites offer large data sets with daily observations at global scales. These data sets represent a rich resource that, because of the high acquisition rate, allows the application of time-series analysis methods. To research the application of these time-series analysis methods to large data sets, it is necessary to turn to high-performance computing (HPC) resources and software designs. This article presents an overview of the development of the *HiTempo* platform, which was designed to facilitate research into time-series analysis of hyper-temporal sequences of satellite image data. The platform is designed to facilitate the exhaustive evaluation and comparison of algorithms, while ensuring that experiments are reproducible. Early results obtained using applications built within the platform are presented. A sample model-based change detection algorithm based on the extended Kalman filter has been shown to achieve a 97% detection success rate on simulated data sets constructed from MODIS time series. This algorithm has also been parallelized to illustrate that an entire sequence of MODIS tiles (415 tiles over 9 years) can be processed in under 19 minutes using 32 processors.