NATIONWIDE DISTURBANCE ATTRIBUTION ON NASA'S EARTH EXCHANGE: EXPERIENCES IN A HIGH-END COMPUTING ENVIRONMENT

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Abstract—The North American Forest Dynamics (NAFD) project's Attribution Team is completing nationwide processing of historic Landsat data to provide a comprehensive annual, wall-to-wall analysis of US disturbance history, with attribution, over the last 25+ years. Per-pixel time series analysis based on a new nonparametric curve fitting algorithm yields several metrics useful for elucidating causal processes underlying forest disturbance dynamics but requires CPU-intensive computation across large data sets (>4 billion pixels classified as forest in 434 Landsat scenes covering the conterminous US). FIA has worked collaboratively with NASA to conduct all processing for this project in NASA's Earth Exchange (NEX) which includes the Pleiades supercomputer providing 210,336 CPU cores, 719 TB total memory, and 15 PB of disk storage. In this presentation, we describe the NEX computing environment, outline our processing steps for the NAFD attribution work, identify computing needs for this application, and present results from efficiency trials under different parallel processing strategies.

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