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Multi-threaded compression of Earth observation time-series data

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Abstract:
Earth observation data are typically compressed using general-purpose single-threaded compression algorithms that operate at a fraction of the bandwidth of modern storage and processing systems. We present evidence that recently developed multi-threaded compression codecs offer substantial benefits over widely used single-threaded codecs in terms of compression efficiency when applied to a selection of moderate resolution imaging spectroradiometer (MODIS) datasets stored in the HDF5 format. Compression codecs from the LZ77 and Rice families are shown to vary in efficacy when applied to different MODIS data products, highlighting the need for compression strategies to be tailored to different classes of data. We also introduce LPC-Rice, a new multi-threaded codec, that performs particularly well when applied to time-series data.