## PARALLEL ACCESS TO NETCDF FILES IN HIGH PERFORMANCE APLICATIONS FROM HIGH-LEVEL FRAMEWORKS

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## Abstract

The analysis of climate variability requires to perform operations with netCDF files [1], Empirical Orthogonal Functions analysis (EOF), and Singular Value Decompositions (SVD) of coupled data sets. As example, PyClimate [2] is a Python package designed to accomplish these tasks sequentially. However, the huge data volume in this kind of applications requires high performance routines that can be executed in distributed memory architecture platforms. High performance linear algebra operations can be performed with the high-level framework PyACTS [3]. Also, huge volume of the netcdf files requires a parallel tool for Python. In this way, we present PyPnetCDF like a Python package that implements parallel access to netCDF files using PnetCDF library [4]. The results show a scalable tool with very lower execution times than the sequential application when the data volume is high.

## References

- [1] R. REW AND G. DAVIS, *The unidata netCDF: software for scientific data access*, VI IIPS for Meteorology, Oceanography and Hydrology. Anaheim, CA, 2001.
- [2] J. SAENZ, J. ZUBILLAGA AND J. FERNANDEZ, Geophysical data analysis using Python, Computers and Geosciences, 28, 4 (2002), pp. 457–465.
- [3] L. A. DRUMMOND, V. GALIANO, V. MIGALLÓN AND J. PENADÉS, PyACTS: A highlevel framework for fast development of high performance applications. Proceedings from VECPAR'06. Rio de Janeiro, Brazil, 2006.
- [4] J. LI, W. LIAO, A. CHOUDHARY, R. ROSS, R.THAKUR, W. GROPP, R. LATHAM, A. SIEGEL, B. GALLAGHER AND M. ZINGALE, *Parallel netCDF: A high-performance scientific I/O interface*. Proceedings of SC2003: High Performance Networking and Computing. IEEE Computer Society Press, 2003.