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Climate Data Operators for quick look visualization

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Geophysical computations, in particular numerical weather and climate predictions, consume huge computational resources and generate voluminous amount of multidimensional data in various formats. The post-processing of these data involves, manipulation to generate diagnostics and visualization. These tasks demand software tools, that are efficient in data handling, computation and graphical processing. Apart from that, these tools need to be highly user friendly characterized by a smooth learning curve, as they address a wider audience with varying backgrounds. A typical work flow to accomplish the task in e.g. climate prediction, involves the usage of various interactive and non-interactive tools in tandem. One such work flow can be constituted by using the Climate Data Operators (CDO) software that enables the efficient manipulation of the data, in conjunction with other visualization tools. CDO provides over 600 command line operators for performing simple statistical and arithmetic functions, selection and sub-sampling and spatial interpolation of the data.

But the ever increasing work flow requirements necessitates, a seamless synergy of data manipulation and visualization tools. Such a synergy improves the work flow efficiency and enhances the productivity. In this direction, new plotting operators are created in the CDO by exploiting the plotting capabilities of the Magics++ library. These plotting operators are in tune with the chaining capabilities of the existing CDO operators and provide a non-interactive quick look visualization of the data in the form of contour, vector, shaded and graphical plots during post-processing. Moreover, here we apply these operators to monitor online, large ensemble climate prediction computations and avoid unnecessary wastage of valuable computational resources, especially during the model development and tuning phase.