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Development and validation of the European Cluster Assimilation Techniques run libraries

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The European Commission funded the European Cluster Assimilation Techniques (ECLAT) project as a collaboration of five leader European universities and research institutes. A main contribution of the Finnish Meteorological Institute (FMI) is to provide a wide range global MHD runs with the Grand Unified Magnetosphere Ionosphere Coupling simulation (GUMICS). The runs are divided in two categories: Synthetic runs investigating the extent of solar wind drivers that can influence magnetospheric dynamics, as well as dynamic runs using measured solar wind data as input. Here we consider the first set of runs with synthetic solar wind input. The solar wind density, velocity and the interplanetary magnetic field had different magnitudes and orientations; furthermore two F10.7 flux values were selected for solar radiation minimum and maximum values. The solar wind parameter values were constant such that a constant stable solution was archived. All configurations were run several times with three different (-15°, 0°, +15°) tilt angles in the GSE X-Z plane. The result of the 192 simulations named so called “synthetic run library” were visualized and uploaded to the homepage of the FMI after validation. Here we present details of these runs.