

Numerical modelling capabilities from the point of view of a Space Weather forecast facility

**Pierre-Louis BLELLY**<sup>(1)</sup> and J. Lilensten<sup>(2)</sup>

(1) Centre d'Etude Spatiale des Rayonnements, 9 avenue du Colonel Roche, F31028 France

(2) Laboratoire de Planétologie de Grenoble, Observatoire des Sciences de l'Univers de Grenoble, Bâtiment D de physique, B.P. 53, 38041 Grenoble cedex 9, France

pierre-louis.blelly@cesr.fr

Numerical modelling is generally meant as the use of first principles physics equations to describe the structure and the dynamics of a system characterized with few specific parameters. A comprehensive description with quantified estimation of the modelled parameters requires that the boundary conditions are well constrained and the physical processes are correctly accounted for. In the particular case of the Sun-Earth connection, the system is so wide and so many different mechanisms are involved that it cannot be embraced in one single model and thereby must be decomposed in sub-domains like sun surface, solar wind, magnetosphere, ionosphere, atmosphere ... Such an operation allows a better description for each sub-system, but when it comes to address the question of the global modelling, this introduces new strong constraints like :

- physical couplings conditions
- numerical boundary conditions

Through a brief panorama of existing models, we will address the question of critical points in the transmission line from the Sun to the Earth in the perspective of building up a comprehensive global model dedicated to the space weather : weaknesses in the modelling as well as boundary conditions problems, ...

At last, in the frame of GRID initiatives, the idea of collaborative work effort will be evocated for the development of such a global model for the Solar Terrestrial environment. In particular, we will discuss some aspects of the ESA SpaceGRID project which are related to the space weather.