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On the assessment of space weather models for operational use: evaluation of the performance of ionospheric forecasting models

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The assessment of the performance of space weather models for operational applications involves among other tests the determination of the models' accuracy under all possible conditions. For this purpose, systematic validation and verification procedures that are able to drive the efforts beyond the conventional scientific evaluation of the models' performance are required. Because of its significance in the development of reliable operational services, this task is centrally addressed within COST ES0803 Action "Developing Space Weather Products and Services in Europe" (http://www.costes0803.noa.gr). This contribution aims to summarize recent advances obtained within COST ES0803 Action that include review results regarding the current practice on the assessment of space weather models for operational use as well as specific model validation and verification efforts. In particular, the emphasis here will be given to the evaluation of the performance of two ionospheric forecasting models: the Solar Wind driven autoregression model for Ionospheric short-term Forecast (SWIF) and the Geomagnetically Correlated Autoregression Model (GCAM), which are implemented online in the European Digital upper Atmosphere Server – DIAS system (http://dias.space.noa.gr) to provide single site and regional ionospheric forecasts for the European region. The analysis rely on the systematic comparison between models' predictions and actual observations obtained over almost one solar cycle (1998-2007) at several European ionospheric locations. The results verify operational validity for both models and quantify their prediction accuracy under all possible conditions to support operational applications but also to facilitate future comparisons/developments in assessing or expanding the current ionospheric forecasting capabilities.