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An ionospheric disturbance forecast model based on real-time solar wind analysis with the best-fitting historical storm events

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A modeling approach for long time predictions (more than 12 h) of ionospheric disturbances driven by solar storm events is presented. Intended for an operational framework, this model shall deliver fast and precise localized warnings for these disturbances in the future. For this reason, a data base of historical solar storm impacts covering two solar cycles is used to reconstruct future events and resulting ionospheric disturbances. Here, we will present the basic components of the model and show first validation results based on predicted and observed geomagnetic activity, global total electron content and selected solar storms. Two storm events (including the St. Patrick's Day geomagnetic storm during the 17 March 2015) are analyzed in more detail to illustrate the model capabilities. We will also discuss possible future improvements of the individual model parts, as well as the planned extensions and applications.