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Strategy and key issues for seamless integrated chemistry-meteorology modeling

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Online coupled meteorology atmospheric chemistry models have greatly evolved in recent years. Although mainly developed by the air quality modeling community, these integrated models are also of interest for numerical weather prediction and climate modeling as they can consider both the effects of meteorology on air quality, and the potentially important effects of atmospheric composition on weather. This presentation summarizes the main conclusions from the European COST Action ES1004 “European Framework for Online Integrated Air Quality and Meteorology Modelling (EuMetChem)” and the following “Symposium on Coupled Chemistry-Meteorology/Climate Modelling: Status and Relevance for Numerical Weather Prediction, Air Quality and Climate Research” which was co-organised by EuMetChem and the World Meteorological Organization. It offers a brief review of the current status of online coupled meteorology and atmospheric chemistry modeling and a survey of processes relevant to the interactions between atmospheric physics, dynamics and composition. In addition, it highlights scientific issues and emerging challenges that require proper consideration to improve the reliability and usability of these models for three main application areas: air quality, meteorology (including weather prediction) and climate modeling. It presents a synthesis of scientific progress in the form of answers to nine key questions and provides recommendations for future research directions and priorities in the development, application and evaluation of online coupled models.

References

Baklanov, A., D. Brunner, G. Carmichael, J. Flemming, S. Freitas, M. Gauss, O. Hov, R. Mathur, K. Schlünzen, C. Seigneur, and B. Vogel, 2017: Key issues for seamless integrated chemistry-meteorology modeling. Bull. Amer. Meteor. Soc., doi:10.1175/BAMS-D-15-00166.1 [Available online at http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-15-00166.1]

Baklanov, A., B. Vogel, and S. Freitas, Eds., 2015: Coupled chemistry–meteorology modelling: Status and relevance for numerical weather prediction, air quality and climate communities. Special issue #370 jointly organized between Atmos. Chem. Phys. and Geosci. Model Dev. [Available online at www.atmos-chem-phys.net/special_issue370.html]

WMO CCMM, 2016: Coupled Chemistry-Meteorology/Climate Modelling (CCMM): Status and relevance for numerical weather prediction, atmospheric pollution and climate research (Symposium materials). WMO GAW-WWRP-WCRP Report #226, Geneva, Switzerland. [Available online at www.wmo.int/pages/prog/arep/gaw/documents/Final_GAW_226_10_May.pdf]

WWRP, 2015: Seamless Prediction of the Earth System: From Minutes to Months. WMO-No. 1156. 471 pp. [Available online at http://library.wmo.int/pmb_ged/wmo_1156_en.pdf]