Supplement of

# Analysis of summer $\mathrm{O}_{3}$ in the Madrid air basin with the LOTOS-EUROS chemical transport model 

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Figure S1. Nested domains of the WRF simulations performed in July 2016 for the MAB.


Figure S2. Location of $\mathrm{O}_{3}$ monitoring stations in the MAB used for LOTOS-EUROS evaluation. Basemap obtained from Landsat/Copernicus; ©2018 Google; ©2009 GeoBasis-DE/BKG; Data SIO, NOAA, U.S. Navy, NGA, GEBCO.


Figure S3. Time series for July 2016 of the $5^{t h}, 50^{t h}$ and $95^{t h}$ percentiles of LOTOS-EUROS bias with respect to the $\mathrm{O}_{3}$ observations from 35 background stations in the MAB.


Figure S4. Real and modelled vertical profiles of wind direction and velocity for the 6, 13, 20 and 27 July 2016. Simulated profiles were taken from ECMWF and WRF input data.


Figure S5. Simulated $\mathrm{O}_{3}$ concentrations, relative humidity (RH), and U and V components of wind over the centre of the MAB in July 2016.


Figure S6. Simulated hourly $\mathrm{O}_{3}$ concentrations vs. observations during July 2006 in in four stations representative of the different areas of the MAB: ALG on the central part of the MAB, AZU on the Henares valley at the northeast, ORT on the east and SMV on the southwest.

| Category | Setup |
| :---: | :---: |
| Shortwave radiation | MM5 Shortwave radiation scheme (Dudhia, 1989) |
| Longwave radiation | Eta Geophysical Fluid Dynamics Laboratory (GFDL) (Schwarzkopf and Fels, 1991) |
| Land-surface model | Noah LSM (Chen and Dudhia, 2001) |
| Microphysics scheme | WSM6 (Hong and Lim, 2006) |
| PBL Scheme | Yonsei University (YSU) (Hong et al., 2006) |
| Horizontal resolution | 1 km |
| Vertical resolution | 35 sigma levels |

Table S1. Basic configuration of WRF model for the simulations performed in this study.

