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Improving the predictions of black carbon (BC) optical properties at various aging stages using a machine-learning-based approach

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Results in terms of percentage error

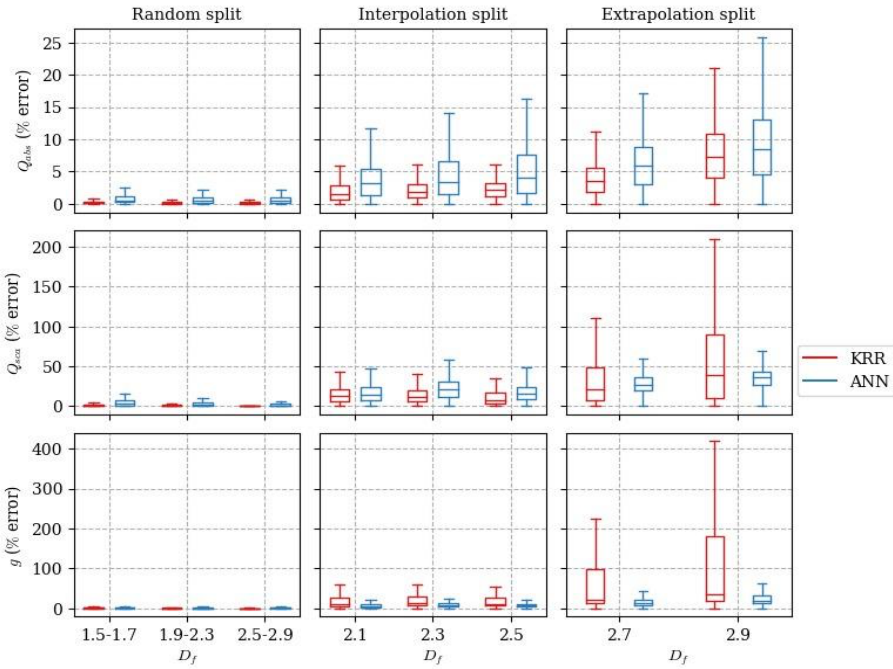

Figure S1. Boxplots summarizing the percentage error between the predicted value and the true value for three optical properties with respect to D_f.

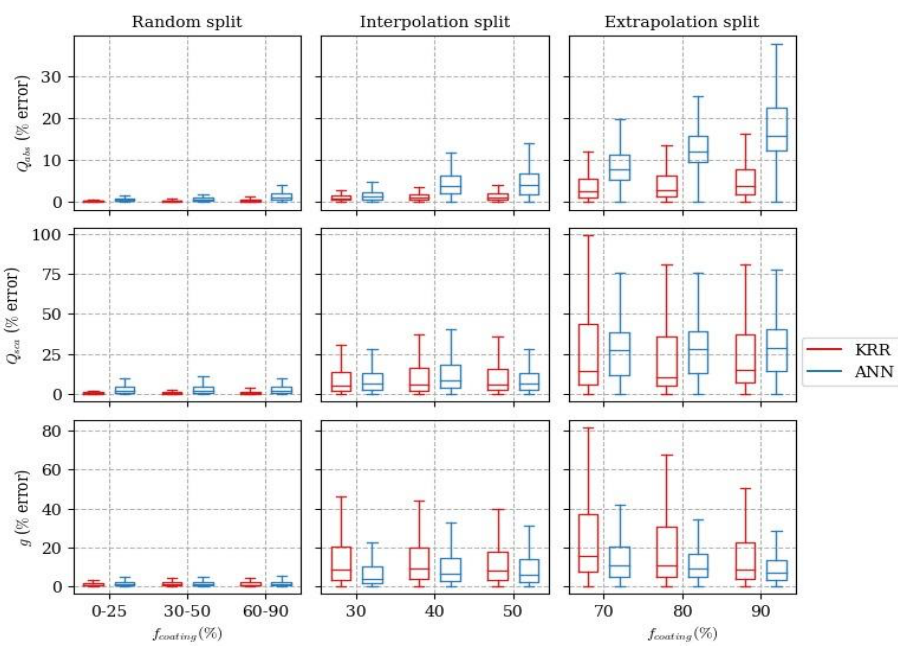

Figure S2. Boxplots summarizing the percentage error between the predicted value and the true value for three optical properties with respect to $f_{coating}$.

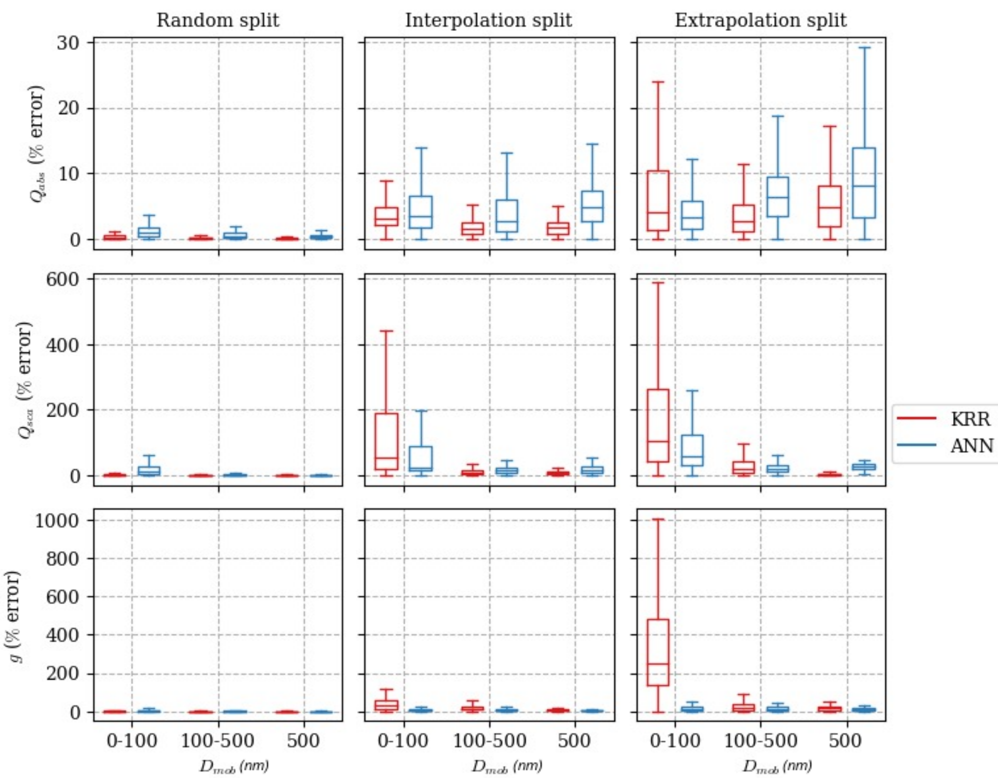

Figure S3. Boxplots summarizing the percentage error between the predicted value and the true value for three optical properties with respect to D_m.

Lifecycle of BC

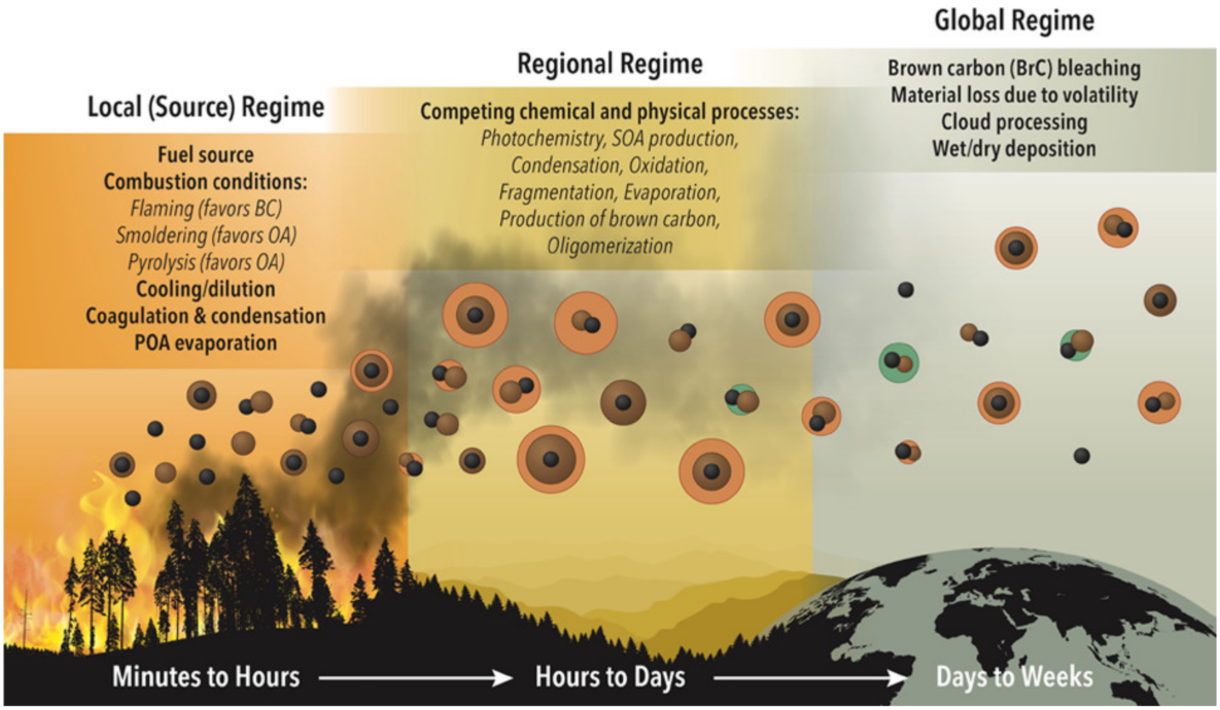

Figure S4. Lifecycle of BC particles adapted from Sedlacek et al., 2022.

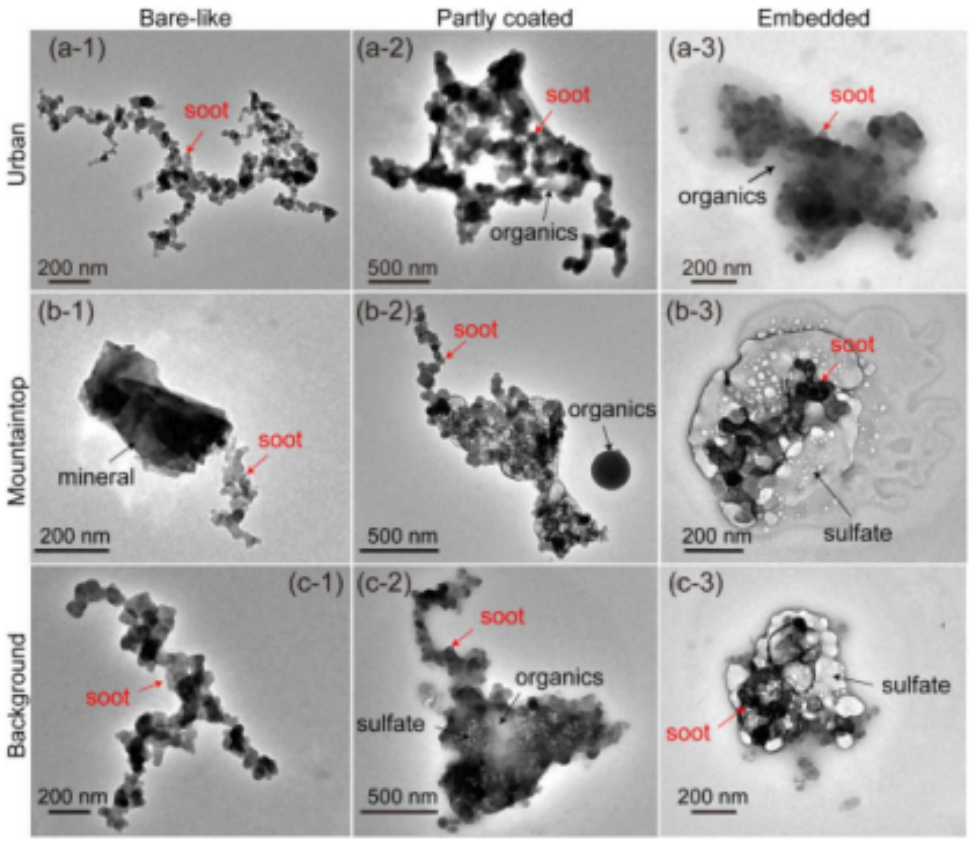

Figure S5. Transmission electron microscopy (TEM) images adapted from Fu et al., 2012 showing wide range of BC morphologies at different locations.

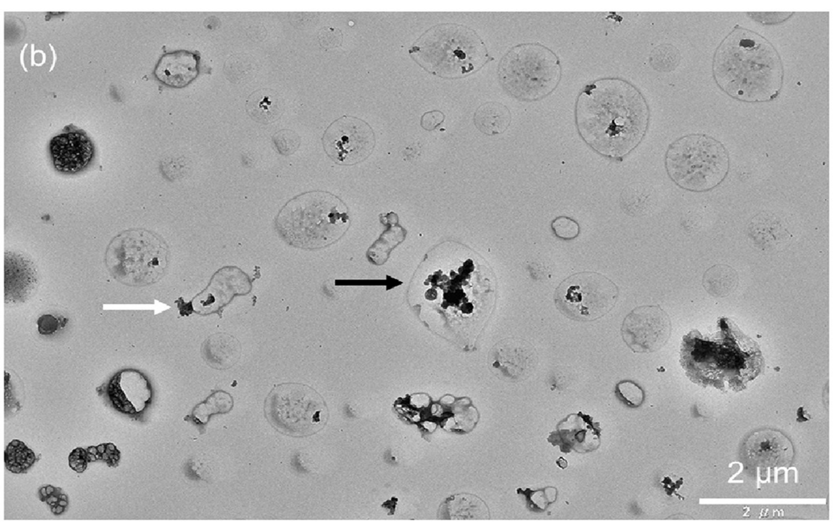

Figure S6. Results from TEM analysis showing that aged transported soot can retain its fractal morphology 500 to 1000 km downwind of emission source, taken from Sun et al., 2022.

References:

Fu, H., Zhang, M., Li, W., Chen, J., Wang, L., Quan, X., and Wang, W.: Morphology, composition and mixing state of individual carbonaceous aerosol in urban Shanghai, Atmos. Chem. Phys., 12, 693–707, https://doi.org/10.5194/acp-12-693-2012, 2012.

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