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Transitional dispersive scenarios driven by mesoscale flows on complex terrain under strong dry convective conditions

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Abstract. By experimentation and modelling, this paper analyses the atmospheric dispersion of the SO₂ emissions from a power plant on complex terrain under strong convective conditions, describing the main dispersion features as an ensemble of "stationary dispersive scenarios" and reformulating some "classical" dispersive concepts to deal with the systematically monitored summer dispersive scenarios in inland Spain. The results and discussions presented arise from a statistically representative study of the physical processes associated with the multimodal distribution of pollutants aloft and around a 343-m-tall chimney under strong dry convective conditions in the Iberian Peninsula. This paper analyses the importance of the identification and physical implications of transitional periods for air quality applications. The indetermination of a transversal plume to the preferred transport direction during these transitional periods implies a small (or null) physical significance of the classical definition of horizontal standard deviation of the concentration distribution.

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