Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02652, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02652
EGU General Assembly 2008

Potential outflows pathways for Iberian atmospheric middle-lived pollution. Sinks of middle-lived pollutants and aerosols.

R. Nieto (1,2), L. Gimeno (1) and L. de la Torre (1)

(1) Universidad de Vigo, Dpto Física Aplicada, Facultad de Ciencias de Ourense, Ourense, Spain. (2) University of Lisbon, CGUL, IDL, Lisbon, Portugal.

There are a large number of atmospheric substances that can undergo long-range transport and impacts the tropospheric composition thousands of kilometres downwind from their source region. This atmospheric transport occurs on timescales of the order of 3–10 days and it is crucial for substances that have a lifetime within this range (typically ozone (O_3) and its precursors, aerosols, mercury or persistent organic pollutants). During the last years, different research projects, using normally a three dimensional model of chemistry and transport, have explored the continental outflow of these middle-lived substances of North America, Asia or Europe.

New advanced Lagrangian atmospheric transport models enable us to establish, almost unambiguously, source-receptor relationships over long distances that correspond to 10 days of transport. The present study is intended to give a view of the export pathways for these middle lived substances from the Iberian Peninsula by using the successful Lagrangian particle dispersion model FLEXPART (Stohl et al., 1998) and meteorological analysis data from the European Centre for Medium-Range Weather Forecasts (ECMWF). A period of five years, from 2000 to 2004, was analyzed. This study complements the previous one done by Nieto and Gimeno (2006) which studied the potential sources of these middle lived substances reaching the Iberian Peninsula.

Three conclusions can be extracted from this study:

1) The Mediterranean Sea and the Central Asian regions are the main pathways of the

air from the Iberian Peninsula in the studied range of 3-10 days.

2) The highest importance of Mediterranean sink is limited to the fourth or fifth day of transport, from fifth to tenth day the Central Asian sink gains relevance, and

3) The Mediterranean sink is seasonally-consistent however the Central Asian sink is sounder during autumn and winter.

These conclusions are in agreement with previous studies of the intercontinental transport of pollutants and aerosols. Due to the strong anthropogenic-produced aerosols and pollutant emissions in the Western Europe (Duncan and Bey, 2004), Iberian Peninsula is the main potential contributor to the middle-lived pollutants over the Mediterranean Sea.

Results confirm that the Mediterranean Sea and Central Asia are the dominant sinks of the air coming from the Iberian Peninsula in the range of 3 to 10 days of transport.

Stohl, A., M. Hittenberger, and G. Wotawa (1998) Validation of the Lagrangian particle dispersion model FLEXPART against large scale tracer experiment data. Atmos. Environ., **32,** 4245–4264.

Nieto, R. and Gimeno, L. (2006) Atmospheric transport towards the Iberian Peninsula in the 3- to 10-day range. Sources of middle-lived pollutants and aerosols. TheScientificWorldJOURNAL 6, 1041–1047. doi 10.1100/tsw.2006.208.

Duncan, B. N., and I. Bey (2004) A modelling study of the export pathways of pollution from Europe: seasonal and interannual variations (1987-1997). J. Geophys. Res. 109, D08301, doi: 10.1029/2003JD004079.