HYSPLIT RESULTS:

HYSPLIT:-

Lagrangian particle models compute trajectories of a large number of so-called particles to describe the transport and diffusion of tracers in the atmosphere. The main advantage of Lagrangian models is that, unlike in Eulerian models, there is no numerical diffusion. The HYSPLIT-4.9 Hybrid Single-Particle Lagrangian Integrated Trajectory Model has been used to determine the back trajectory of air masses. In this study, we employ a simple approach of ensemble trajectories by using HYSPLIT version 4.9, http://www.arl.noaa.gov/ready/hysplit4.html, Draxler,2003) model to determine the back trajectory. The meteorology of GDAS 0.5° daily files every three hours on the native GFS hybrid sigma coordinate system high-resolution data is used as input for the HYSPLIT back trajectory calculation. There are many uncertainties in the calculation of trajectories arising from the possible errors in input meteorological fields and the numerical methods. To reduce uncertainties associated with a single trajectory, the HYSPLIT is run in the ensemble mode to generate multiple trajectories from a single meteorological field (Draxler, 2003). Each ensemble member is computed from the same location, but during the initial calculation the meteorological grid is offset by ±1 factor in the horizontal (x, y) direction and ±0.005 factor in the vertical direction. The configuration results in 27 ensemble members and each member are assumed to have an equal probability. All backward trajectories were simulated in accordance with a sample time of measurements performed at 20 meter above the ground level. The below we have given some preliminary results of backward trajectories calculations during **Meteor cruise M78/2.**

Figure one shows that the observations point at these latitude and longitudes during Meteor cruise M78/2. The preliminary results of HYSPLIT model (Figure 2-4) shows that the airmass comes from African coast as well as South American coast. The back trajectories revealed that the concentrations of methyl halides are slightly higher in air being in contact with or close to continental air masses such as the West coast of Africa or the East coast of South America (from chemistry results).

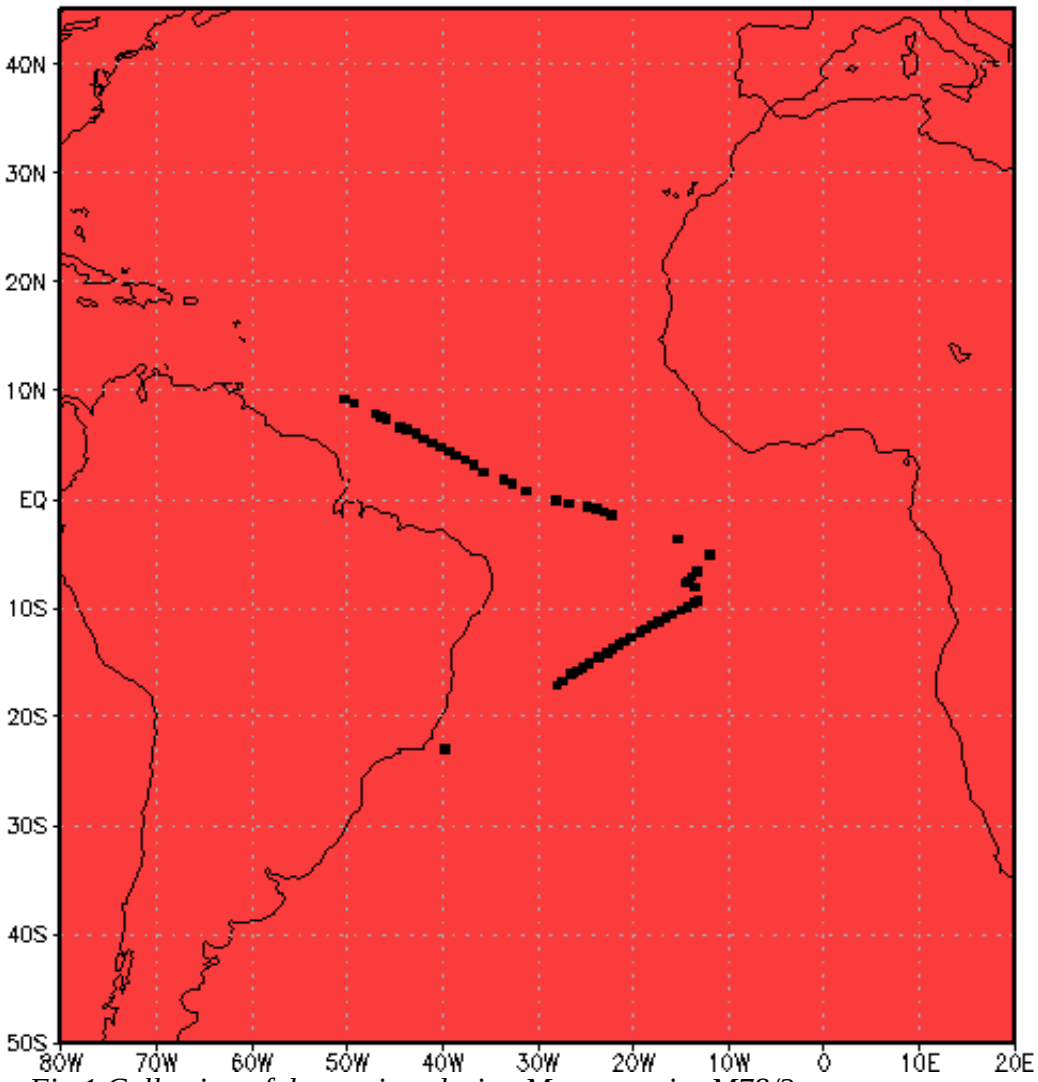

Fig.1 Collection of data points during Meteor cruise M78/2.

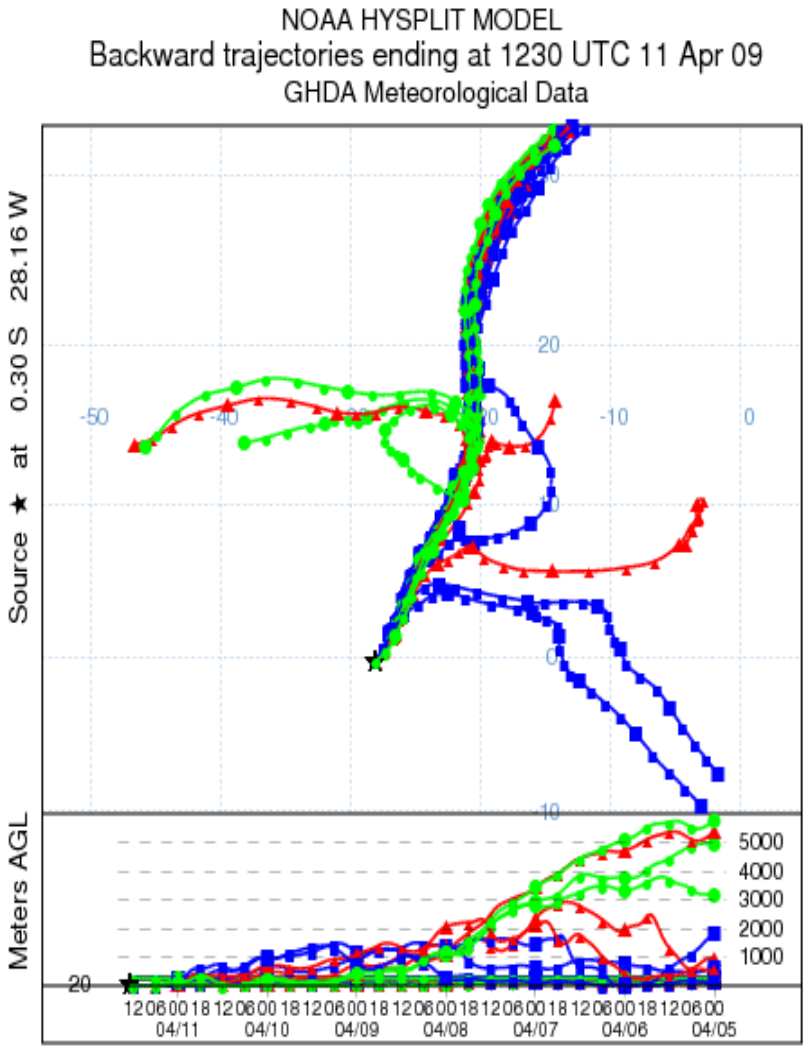

Fig.2 Calculated ensemble backward trajectories using 0.5° resolution GHDA Meteorological data.

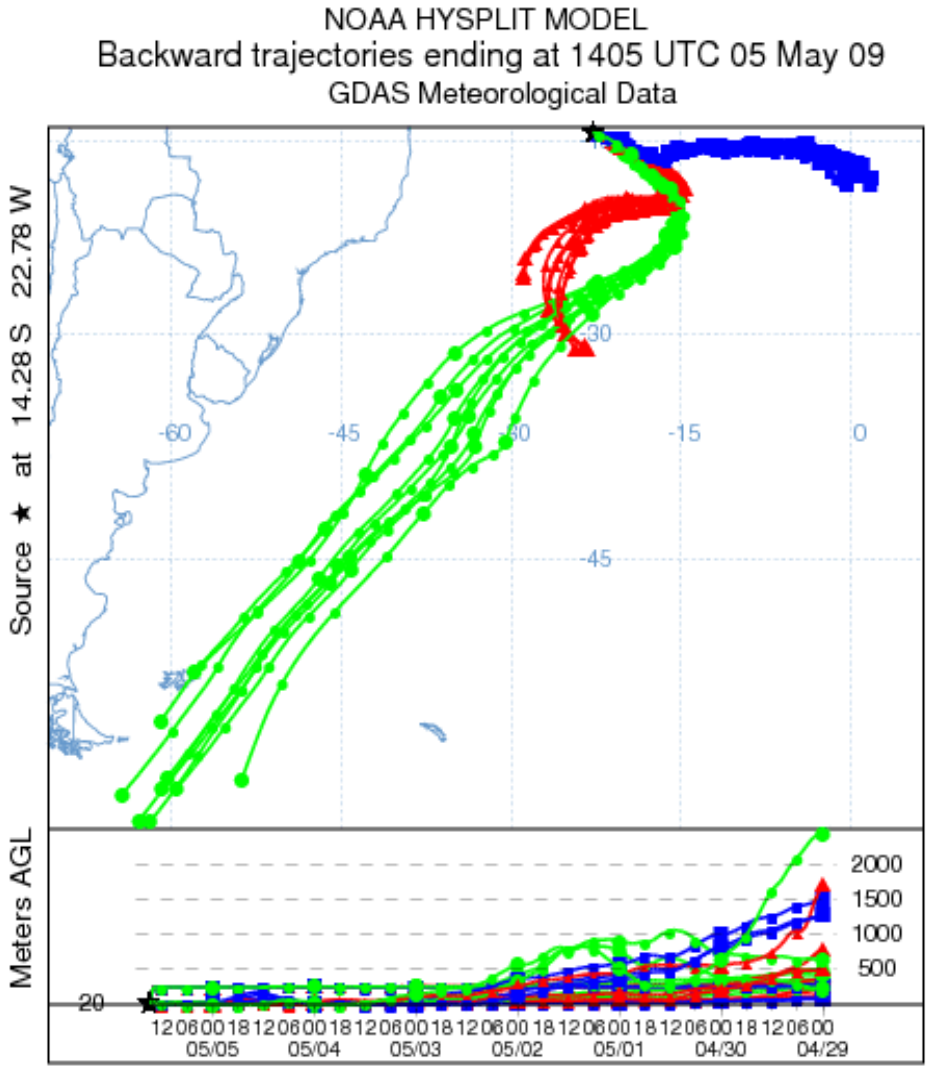

Fig.3 Calculated ensemble backward trajectories using 0.5° resolution GHDA Meteorological data.

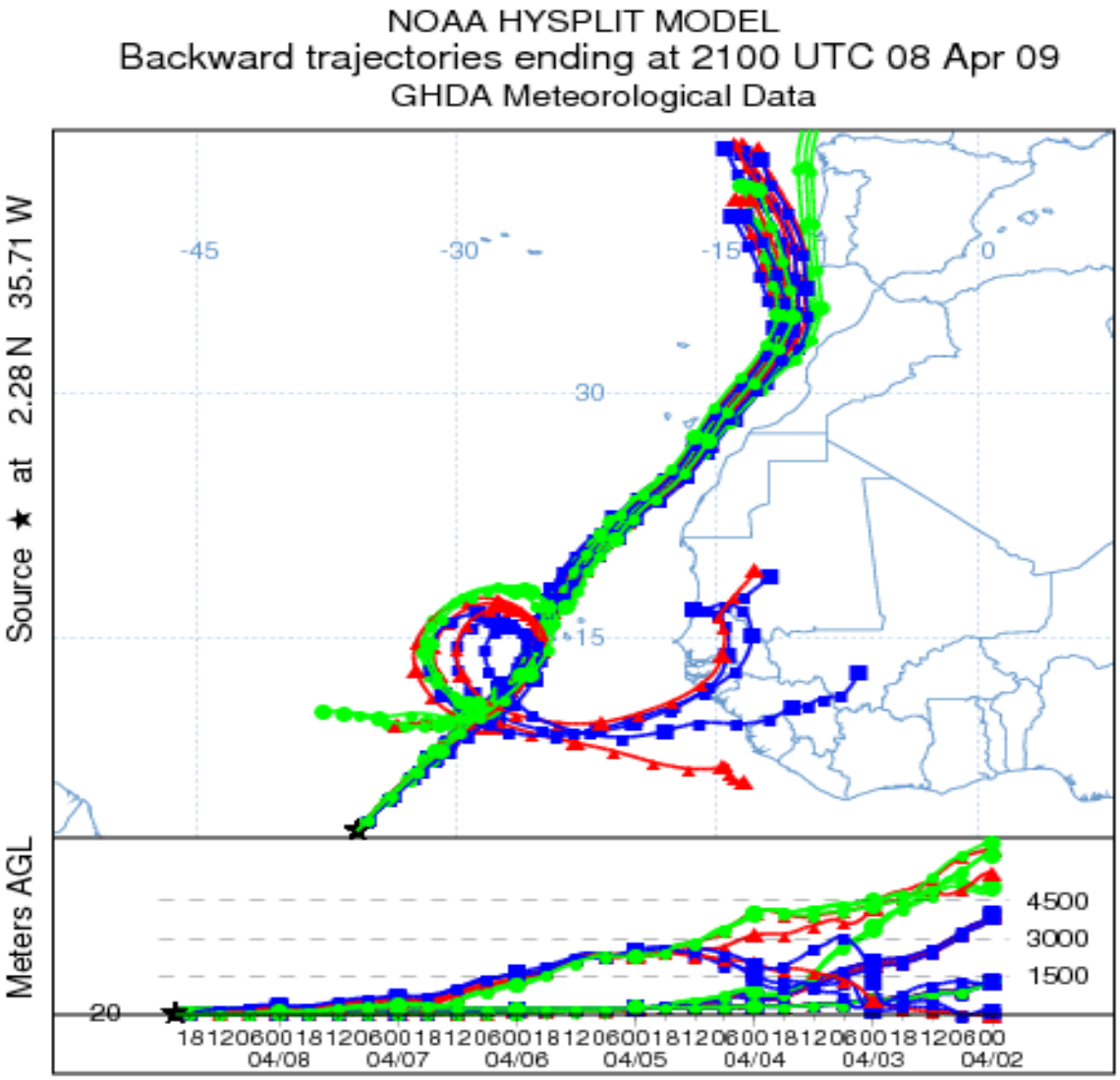

Fig.4 Calculated ensemble backward trajectories using 0.5° resolution GHDA Meteorological data.

Meteorological model set-up for Brazil

The meteorological model METRAS has been set-up for a domain of 120 km x 120 km in the region of Belem at a horizontal resolution of 1 km in order to provide a high resolution forecast for the sampling campaigns. The surface parameters used in METRAS for different land use classes have been adapted to suit the sampling area. METRAS has also been enabled to use forcing data from the forecast model MBAR (7 km resolution) at the outer boundaries, using a nudging technique. This is an improvement to the original project proposal, where the intended forcing data was from NCEP at a much coarser resolution. The data is provided by the Instituto Nacional de Meteorologia (INMET) for 3-day forecasts. The full set-up is currently being evaluated with sample datasets for different periods.

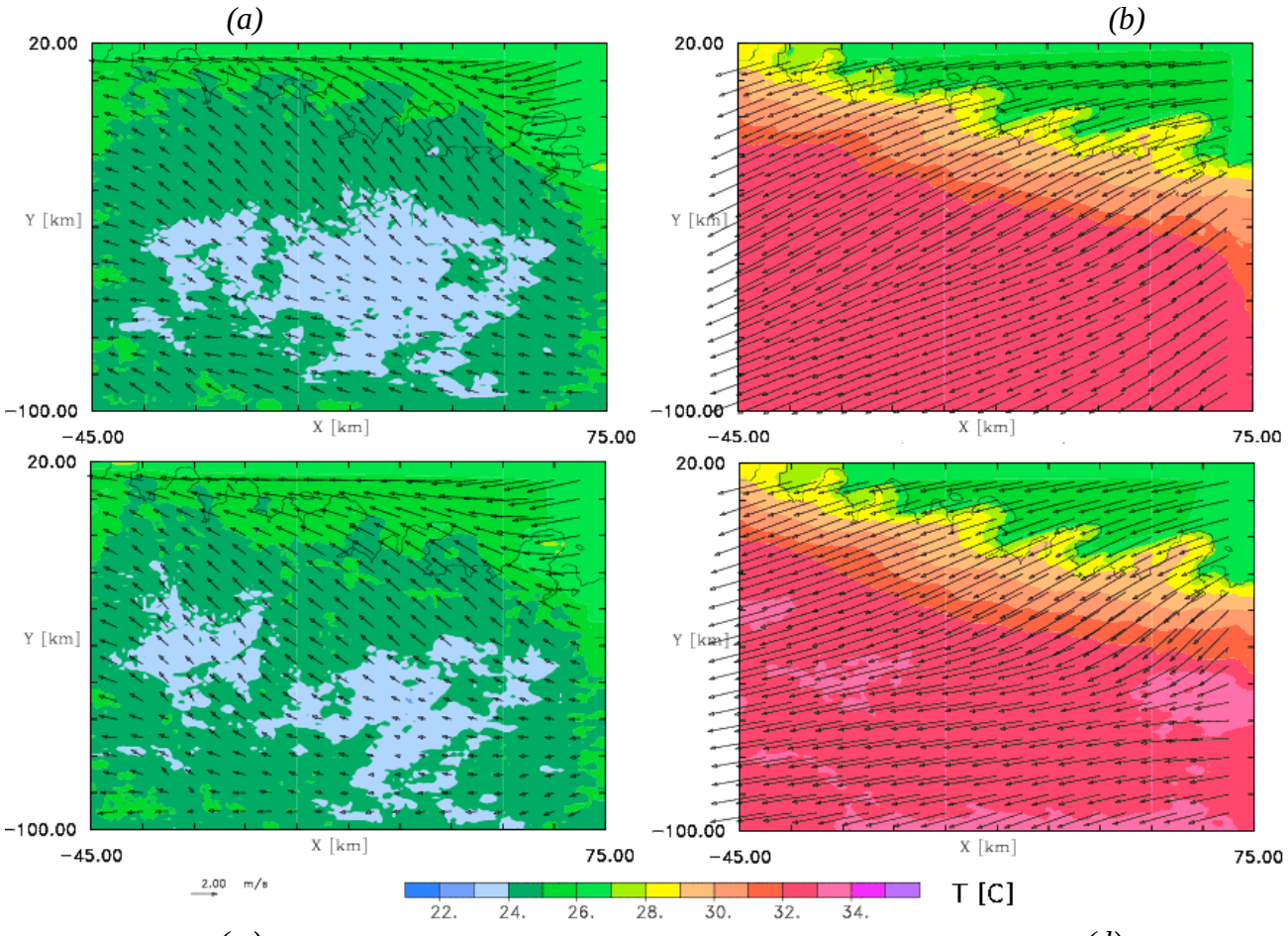

Figure 5: METRAS forecast at two consecutive days for the sampling region. (a) 2 March 2010, 8am; (b) 2 March 2010, 3pm; (c) 3 March 2010, 8am; (d) 3 March 2010, 3pm. (all local time). Note the increased wind velocity component onto the land during the afternoon.