Response to bg-2017488

We are appreciate for comments from anonymous referee concerning our manuscript entitled "Characteristics of wet dissolved carbon deposition in a semi-arid catchment at the Loess Plateau, China" (ID:bg-2017488). We have studied comments carefully and have made corrections and adjustments. Our responses in the revision according to the referee's comments are as follows:

Comment 1: It needs to stress that the DOC in rain measured, they can only originate from gas phase OC, which leads to dissolved OC. An analysis of air mass back trajectories would help to improve the manuscript

Response: Thanks for your suggestions. The approach of air mass backward trajectories allow to identify potential gas-phase organic compounds source from regional or distant regions within the study site during the long range transport of air parcels towards the sampling location. Therefore, we have used this analysis method and added some corresponding discussions, the details shows as bellowing:

Line 150-158:

In order to describe the origin of air masses at study site during the sampling period, back-trajectory analyses were performed using Hybrid Single Particle Lagrangian Integrated Trajectory model (HYSPLIT) developed by National Oceanic and Atmospheric Administration-Air Resources Laboratory (NOAA-ARL) (Draxler and Rolph, 2003). The input meteorological data were from Global Data Assimilation System (GDAS). The trajectories were generated for 168-h hindcast starting at 100/500/1000-m above ground level and vertical motion based on model vertical velocity (Siudek et al., 2015) . The weekly air parcel backward trajectories with a 6-h interval were calculated for the Yangjuangou catchment (N 36° 41'50.9″, E 109° 31'37.6″) during July to September, 2015. Therefore, this approach from HYSPLIT simulations is shown in Figure 2 and gives an insight into the relationship between potential source and wet dissolved carbon concentration in rainwater.

Line 169-180:

Back-trajectory analyses demonstrated how the DOC from gas-phase organic compounds changed throughout the study period (Figure 2). Results of dissolved carbon concentration in rainwater reflected the influences of regional or distance carbon source. Elevated DOC concentrations were observed in July, which could be highly influenced by gas-phase organic compounds emitted from local/regional anthropogenic activities, such as biogenic, industrial and traffic emissions (Kieber et al., 2002; Mladenov et al., 2012). However, the decreased DOC concentrations in August and September may be attributed to a reduced gas-phase organic compounds source (Witkowska and Lewandowska, 2016).

Line 243-244:

Indeed, the back-trajectories can provide evidence for explaining the temporal variations of dissolved carbon concentrations, as shown in Figure 2.

Line 253-256:

Overall, observational data from this case study shown temporal variations of dissolved carbon

concentration in rainfall events in the LPR. The temporal variability may attribute to the dissolved carbon source, rainfall characteristics, meteorological conditions and the interactions between ions that impact dissolution of gas-phase organic compounds.

Figure 2:

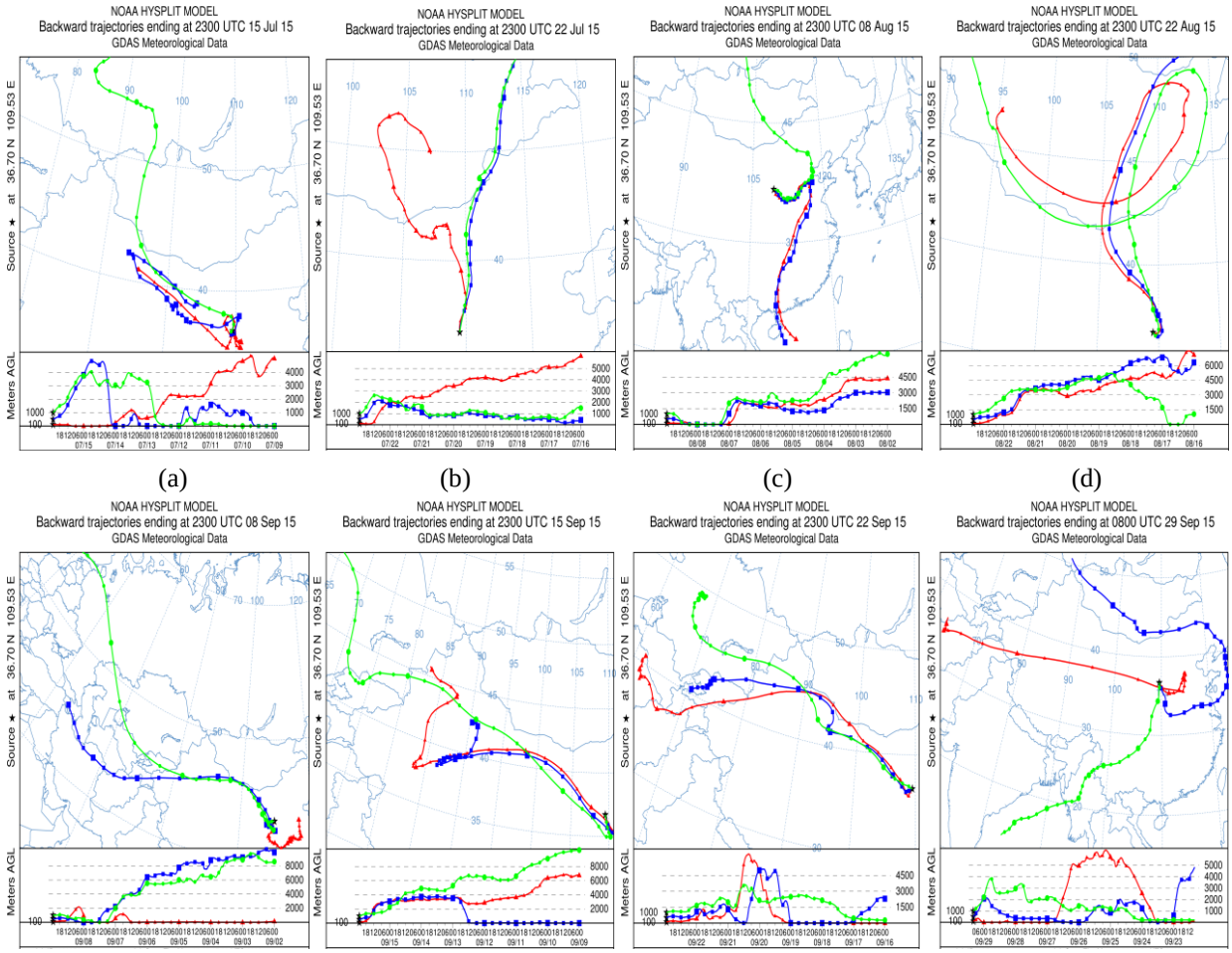

Figure 2 The backward trajectories of air mass calculated by the HYSPLIT model analysis at 100m(red), 500m(blue), 1000m(green) above ground level. Sample collected during (a) 9-15 July, (b) 16-22 July, (c) 1-8 August, (d) 16-22 August, (e) 1-8 September, (f) 9-15 September, (g) 16-22 September, (h) 23-29 September are shown along with the corresponding backward trajectories.