

## ***Interactive comment on “Atmospheric Brown Clouds in the Himalayas: first two years of continuous observations at the Nepal-Climat Observatory at Pyramid (5079 m)” by P. Bonasoni et al.***

### **Anonymous Referee #2**

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1. General Comments This article analyzes a data set of meteorological parameters, ozone, black carbon and particulate matter collected at the Nepal Climate Observatory – Pyramid (NCO-P) at 5079 masl in Himalayas. Initially, a descriptive analysis of the seasonal changes on weather conditions is performed, by combining in-situ data with back-trajectories and meteorological fields determined by mesoscale modelling. In a second step, the influence of long range transport and of seasonal weather conditions (with special emphasis on monsoon) on the variability of some pollutants is performed. The paper is of high interest for the atmospheric scientist community and is within

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the scope of ACP. I have some general comments about the manuscript. 1.1. When reading the manuscript it is not clear what findings are results of this paper and what findings are results of other companion papers. In some sections, the most relevant results are accompanied by a reference to a paper that is (in most of times) in preparation. Some examples: section 4.1 Atmospheric composition during the monsoon period. The results of this section are that very low BC, O<sub>3</sub> and coarse particles are typically recorded during the monsoon period. When discussing the data a reference is performed to other three papers that analysed the same data base: Marinoni et al.(2010), Sellegri et al. (2010) and Decesari et al.(2010). In the reference list these appear as papers “in preparation”. The question is: what is new in this article?. A similar situation is found in section 4.2, with references to Marinoni et al.(2010) and Decesari et al.(2010). Also 4.2.1, with several references to Marinoni et al.(2010).

1.2. In Section 2 (Measurements and Methodologies), a detailed description of the measurements program at the NCO-P site is performed. However, most of these data are not analysed in this paper. For example, DMPS/SMPS, Scattering coefficient, Aerosol Optical Depth and aerosol chemical composition, data are not used in this study. The description of the measurements techniques makes confusion.

1.3. After reading the paper and taken into account the comments above (#1 and #2), it seems that authors tried to do an general analysis of the data, with alternative treatment to those performed in the companion papers. If this is the case, I then suggest to authors to say it directly at the end of the Introduction. To say clearly what the objective of this paper is, and to say what is different in this paper with relation to the companion papers. I think it is necessary to state clearly the objectives.

## 2. Specific Comments

2.1 Section 2.2 Measurements and sampling procedures. When describing the measurements with the MAAP, it is said that a value of 6.6 m<sup>2</sup>/g was used for the mass absorption coefficient. This is the standard value provided by the manufacturer. My

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question: Did the authors determine the “mass absorption coefficient” experimentally for the type of aerosol / mixing of aerosols, present in the study area?, because they have EC determined by analysis on filter they may determine this value. This could provide more realistic data of BC. Previous studies have shown that the “mass absorption coefficient” may exhibit values very different to that provided by the manufacturer. For example, Petzol et al. (Atmos. Chem. Phys., 8, 407–423, 2008) observed values of 7.6 and 11.1 m<sup>2</sup>/g in the Alps.

2.2. The objective of the manuscript is to study the Atmospheric Brown Clouds. The measurements program at the NCO-P includes a number of parameters, most of them not analysed in this study. Authors have only studied the behaviour of BC and O<sub>3</sub> (and of PM<sub>1</sub> and coarser particles in some sections). My question is: is there any definition for Atmospheric Brown Clouds?, why Atmospheric Brown Clouds are only studied with BC and O<sub>3</sub>?

2.3. Some parts of the manuscript could be shortened.

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