

### Response (*in italics*) to Comments of Referee 3

From my point of view the paper is generally well written, although I find it sometimes difficult to follow the text (which maybe also has to do with my lack of knowledge of stratospheric CH<sub>4</sub> distributions and processes). In any case, I would appreciate a few sentences in the beginning of the discussion of the trends that summarize the processes that lead to an accumulation/decrease of CH<sub>4</sub> and their relation to the BDC. Maybe this would help the reader to follow the discussion of the trends.

In summary, I think only a minor revision is needed before publication that adds some words to improve clarity for the reader.

Technical comments:

- Line 45: It should read "sunrise (SR) and sunset (SS)".

- Line 53: For completeness add the meaning of QBO.

- Line 70: I suggest to already mention the date of the Pinatubo eruption in this line. Moreover it may help to indicate this date also in the timeseries in Figure 1.

*General—I have added several sentences near the end of Section 2 to clarify how to relate the 5-yr trends in CH<sub>4</sub> to those of the BDC. Then, I revised my description of Fig. 3 near the beginning of Section 3, where I describe the changes of BDC to those of CH<sub>4</sub>. I am also more specific now about the tropospheric trends in CH<sub>4</sub> in the early 1990s compared to those after that time, as they relate to the CH<sub>4</sub> trends in the shallow branch of the BDC.*

*Lines 45 and 53—Descriptors have been added.*

*Line 70—I've now included the date of the Pinatubo eruption in the text and as a sentence in the caption of Figure 1 (but not on the figure itself).*