

## ***Interactive comment on “Water vapor total column measurements using the Elodie Archive at Observatoire de Haute Provence from 1994 to 2004” by A. Sarkissian and J. Slusser***

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I agree with both reviewers, that the paper presents a (for atmospheric scientists) new approach to get information of column water vapor measurements based on astronomical observations, which might become attractive for atmospheric science in future. (A similar example is the FTIR observations concerning ozone depleting substances, such as chlorofluorocarbons, which also started from astronomical observations and became a famous archive in atmospheric research). Indeed, changes of atmospheric water vapor are highly relevant for climate science, and therefore the use of such a method making use of a data archive not used in atmospheric science could be highly

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relevant for climate research, but the preliminary results showing a decrease during 10 years seems to contradict the expectation from a climate science perspective. I appreciate the replies of the authors to the comments of the reviewers. However, I agree with both reviewers that the basics of the method are not clear for atmospheric scientists what needs to be improved in the new manuscript. Obviously basic terms such as “absorption cross sections” are used in a completely different way in atmospheric science and in astronomy. In atmospheric science we use the term “absorption cross section” as a molecular property as defined by the law of Beer Lambert (which seems to be the same as the “water vapor optical thickness tau”, if I understood line 5 of page 1082 of the paper correctly). The authors might argue that the terminology used in the paper is basic text book knowledge of any astronomer (possibly referring to Shanon, 1949). However, I don’t believe, that it is realistic that atmospheric scientists will study this paper and I think, this manuscript could be used as a milestone to introduce a (state of the art ?) method of astronomy in atmospheric science. I have to confess that I don’t understand the basic concept of the method and I believe, that the reviewers also don’t quite understand what is plotted e.g. in Figure 1. Therefore, I think you should take the opportunity to describe briefly the basics of the method: What means “water vapor cross section” in astronomy, how is “optical thickness” defined ? You don’t need to provide the details of the method but the basic principle - a section of possibly two pages should be enough. I expect from the authors that such a section will be included a revised version and I hope, that the reviewers will thereafter read the new manuscript again providing a feedback whether they will understand the basics of the method.

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