Reviewer’s report

Title: Ancient water bottle use and polycyclic aromatic hydrocarbon (PAH) exposure among California Indians: a prehistoric health risk assessment

Version: 0 Date: 21 Feb 2017

Reviewer: D. Sarigiannis

Reviewer's report:

The study deals with the assessment of the health risks of PAH exposure from the use and manufacture of the bitumen-coated water bottles employed by ancient California Indian societies. Overall the method for assessing exposure to PAHs, by simulating the manufacturing and storage process is consistent, while the sample analysis is well established. However, a more integrated perspective of risks associated to PAH exposure should be introduced, especially related to cancer risk assessment, although the congeners identified from the chemical analysis are not the most toxic ones. The manuscript seems to be oriented to a specialized group of readers, since it does not add any new knowledge (data or methods) regarding recent environmental health issues. It does, however, offer a fresh view of the application of modern exposure and risk assessment methods to archaeological research. This line of work has already produced significant findings that have, for example, helped explain the causes of death of Queen Cleopatra or other high-level dignitaries in ancient Egypt.

Since the editor finds the manuscript suitable for the journal, the following minor revisions should be addressed by the authors:

- Page 3, Introduction: "In modern human societies, the main sources of PAH exposure are related to fossil fuel processing, gasoline and diesel combustion". Biomass burning for space heating is also a key source of PAHs exposure during winter in several regions (Sarigiannis et al (2015). Lung cancer risk from PAHs emitted from biomass combustion. Environmental Research, 137(0), 147-156), this has also to be mentioned.

- The methodology for risk assessment relies on the comparison of naphthalene exposure levels with the respective EPA's inhalation RfC and oral RfD. It would be more realistic to estimate the respective cancer risks associated to total PAHs exposure (eventually differentiated for people manufacturing and using the bitumen-coated water bottles, and the ones only using them), accounting for the TEF of the respective PAHs identified in the samples.
Level of interest
Please indicate how interesting you found the manuscript:

An article whose findings are important to those with closely related research interests

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organisation that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal