Human arsenic exposure in Bolivian Andes: Where do we stand?

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Abstract:

Inorganic arsenic is a ubiquitous metalloid, with well-known toxic properties for human health. In many regions of the world, human arsenic exposure is identified as a public health problem because of its presence in drinking water and certain food. Even at relatively low levels, regular consumption of contaminated water is considered to increase the risk of cancers in different organs, such as urinary bladder, skin, and lung, probably also liver, kidney and prostate. More recently, multiple other chronic diseases have been associated with environmental arsenic exposure, such as diabetes, cardiovascular diseases, as well as impaired immune function and child development. The WHO guideline water arsenic concentration is 10 µg L^{-1}. Certain plants, rice in particular, is known to easily take up arsenic from the soil.

In the south regions of Bolivia, concentrations above 100 µg L^{-1} have been found in traditional wells or tube-wells used by the population on a daily basis without having a clear knowledge of the situation. This arsenic originates from leaching of arsenic in sediments and volcanic rocks of geogenic origin (Muñoz et al, Ramos OE et al).

Preliminary results of an ongoing cross sectional study have confirmed the human exposure in some villages south from Poopó Lake. Concentration between 10 and 150 µg/L were observed in tap water, traditional wells and tube-wells. The concentrations in collected urines samples, a marker of the total exposure through drinking water and food, confirmed exposure in the low to medium range, known to be associated with increased risk of adverse health effects.

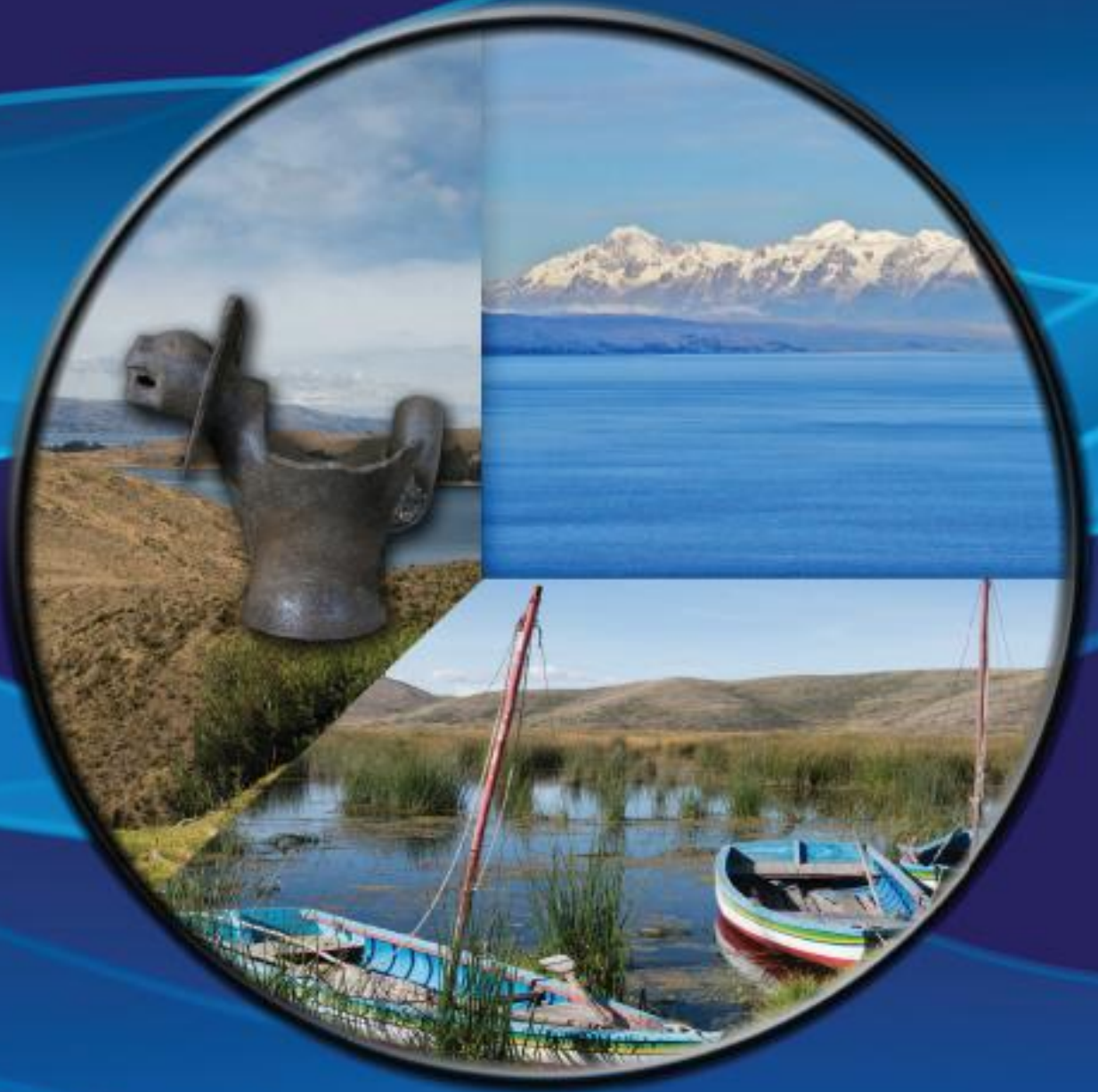
The lack of knowledge by medical staffs of the region and the absence of overt symptoms will be discussed.

References:

Muñoz MO, Wern H, Johnsson F, Bhattacharyaa P, Sracek O, Thunvik R, Quintanilla J, Bundschuh J. 2013. Geogenic ar-senic and other trace elements in the shallowhydrogeologic system of Southern Poopó Basin, Bolivian Altiplano. J Haz Mat 262 924– 940.

Ramos OE, Cáceres LF, Ormachea M, Bhatta-charya P, Quino I, Quintanilla J, Sracek O, Thunvik R, Bundschuh J, García ME. 2012. Source and behavior of arsenic and trace ele-ments in groundwater and sur-face water in the Poopó Lake Basin, Bolivian Altiplano. Environmental Earth Sci-ences 66:793-807.

COLOQUIO INTERNACIONAL SOBRE LA CONTAMINACIÓN ACTUAL E HISTÓRICA EN LOS ECOSISTEMAS ACUÁTICOS ANDINOS



La Paz, 3 al 5 de mayo de 2016
Universidad Mayor de San Andrés, Cota Cota, La Paz

Proceedings

International colloquium on current and ancient contamination in Andes aquatic ecosystems

Coloquio internacional sobre la contaminación actual y histórica en los ecosistemas acuáticos Andinos

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La Paz – May 3rd – 5th 2016

Universidad Major de San Andrès – Campus de Cota-cota, La Paz

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General Planning

- **May 3rd 2016: Contamination and eutrophication of Lake Titicaca**

AM session: Mercury biogeochemistry and contamination of aquatic ecosystems of the Andes region
Keynote Lecture: Hg contamination in Latin America: the past is not what we think, nor the future (J.-R. Davee Guimarães).

PM session: Chemical contamination, eutrophication and monitoring of Lake Titicaca and its watershed
Keynote Lecture: Eutrophication of the Cohana Bay (D. Acha).

- **May 4th 2016: Arsenic issues in the Andes**

AM session: Arsenic biogeochemistry and contamination of aquatic ecosystems of the Andes region
Keynote Lecture: Arsenic contamination of groundwater (Chile) (G. Lobos).

PM session:
Workshop 1: Arsenic and mercury speciation.
Workshop 2: Paleoenvironmental studies in the Andean altiplano.

- **May 5th 2016: Historical reconstructions of the human-climate interactions in the altiplano: implication of archeological purposes**

AM session: Paleo-environmental reconstruction of Altiplano's archives
Keynote Lecture: Holocene Paleoclimatic and Paleoenvironmental History of the Lake Titicaca Basin (S. Fritz & P. Baker).

PM session: Archeology: historical human – environment interactions
Keynote Lecture: Recent contribution of terrestrial and subaquatic archeological investigation in Lake Titicaca (C. Delaere & M-A. Vella).