

National mercury assessment baseline in Bolivia

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Abstract:

We initiated a baseline study and inventory of mercury (Hg) releases, a harmful neurotoxic pollutant, in Bolivia. Identification of Hg sources and preliminary quantification of Hg releases were estimated using the UNEP Hg toolkit. Our preliminary results show an annual average emission of 133 t of Hg (ranges from 44 to 229 t). According to these estimates mining activities represent roughly 70% of the potential Hg emission. More than half of this quantity came from mercury used in artisanal and small scale gold mining (extracting fewer than 500 t/day). The use of extraction/refining products and production of mine wastes that contain Hg represent significant amounts (17% and 7% respectively). However these preliminary estimates should be viewed with caution because of the lack of reliable information on these often informal mining operations which contributes to a broad error range. Moreover these estimates should be compared with the significant amount of 14 t Hg (10% of total emissions), which is the product of soil Hg liberated by erosion and transported from the Andes to the Amazon region, an area more favorable to transformation of elemental and inorganic Hg into the more biotoxic form methylmercury. However some reports show higher ranges of MeHg production in the Andean region that may indicate direct inputs of these pollutants from the mining operations there.

Hg levels in fish and human populations do not appear critical nationally, but in some cases exceed the standard safe intake levels recommended by WHO. However, the inventory of Hg levels in humans and the natural biota also lacks specific information to infer a global view of Hg contamination for Bolivia. In general, the available information was concentrated in the region where high artisanal gold mining activity was developed, such as in the Andes and some main rivers of the Amazon region (Beni, Itenez and Pilcomayo).

Here we present a preliminary map of Hg contamination risk exposure to demonstrate the gap between the potential contamination risk and the actual distribution of Hg studies. Critical lack of studies and assessments about mercury levels was depicted in some important regions of the Amazon with high risk of mercury pollution such as Pantanal and Madre de Dios. Our map suggests that new research is needed to improve the data on Hg in these areas.

Finally we recommend 1) to improve and deepen the inventories of Hg in order to achieve more accurate estimation of emission sources and the fate of mercury in the environment, 2) to develop a spatiotemporal monitoring of mercury levels in fish and humans and 3) to implement policies to prevent the contamination of the biota and human populations. A national political organization, such as a dedicated a secretary, may be necessary to achieve these goals.

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**

**Colloque international sur la contamination actuelle et historique
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La Paz – May 3rd – 5th 2016

Universidad Mayor de San Andrés – 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).