

Processes controlling Methyl-Hg formation and degradation in Lake Titicaca hydrosystem (Bolivian Altiplano)

David AMOUROUX^{1,2}, David POINT^{3,2}, Stéphane GUEDRON^{4,5}, Dario ACHA², Xavier LAZZARO^{6,2}, Laurent CHAUVAUD⁷, Sylvain BOUCHET¹, Annabelle BAYA², Mathilde MONPERRUS¹, Emmanuel TESSIER¹, Remy GUYONEAUD¹, Marisol GONI¹, Julien THEBAULT⁷, Alexis GROLEAU⁸, Anne LORRAIN⁷, Erwan AMICE⁷, Thierry LEBEC⁷, Stephany ROCHA², Carlos HEREDIA², Maria Elena ESPINOZA², Marizol FLORES², Ramon KATARI.

¹IPREM, UMR 5254, CNRS – UPPA, Hélioparc, 2 av Pdt Angot, 64053 Pau, France

²Unidad de Calidad Ambiental –I.E. UMSA, La Paz, Bolivia

³GET-OMP, UR 234, IRD – CNRS – UPS, Toulouse, France

⁴ISTerre-OSUG, UR , IRD – CNRS –UJF, Grenoble France

⁵Instituto de Investigaciones Químicas, UMSA, La Paz, Bolivia.

⁶BOREA, UMR 7208, IRD – UPMC – CNRS - MNHN, Paris, France

⁷LEMAR-IUEM, UMR , CNRS – IRD – UBO, Brest, France

⁸LGE-IPGP, UMR, UDD – CNRS, Paris, France

Abstract:

The aim of the project LA PACHAMAMA (Franco-Bolivian project) was to investigate the biogeochemical cycling of Hg in the high altitude hydrosystem of Lake Titicaca (TDPS), combining integrated ecological approaches, and information on the molecular speciation and isotopic composition of Hg. These extreme lake ecosystems display unique biogeochemical features such as high altitude, significant productivity, high UV radiations and low oxygenated waters that are likely to stimulate significantly both the production and degradation of MeHg. Different representative sites were selected to constrain the role of aquatic plants (totoras), benthic biofilm and macrophytes (characeæ), or water column processes. These sites have been investigated during 2 intensive field campaigns in April/May and October/November 2014. Lake water samples were collected at different locations and depths in the water column. MeHg behaviour at the sediment-water interface was also investigated to assess the influence of benthic biofilm and macrophytes present at the sediment surface on MeHg productio. The transformation pathways were further constrained using in situ incubations with enriched isotopic tracers. Overall the preliminary results show that in this specific ecosystem, the intense benthic biological production, triggered by potential eutrophication, is probably a major contributor to the formation of MMHg and its transfer into the food chain, while intense UV-light radiations may control MMHg content in the water column. This study allows performing a first assessment of Hg contamination source and fate in the lake Titicaca hydrosystem.

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 Mayor de San Andrés – Campus de Cota-cota, La Paz

Organization direction:

Stéphane Guédron (ISTerre-IRD/UMSA): stephane.guedron@ird.fr

Dario Acha Cordero (LCA/UMSA): darioacha@yahoo.ca

Marc-Antoine Vella (IFEA): mav.vella@gmail.com

Oswaldo Eduardo Ramos Ramos (IIQ/UMSA) : roe@kth.se

Organization committee:

Stéphane Guédron (ISTerre-IRD/UMSA): stephane.guedron@ird.fr

Dario Acha Cordero (LCA/UMSA): darioacha@yahoo.ca

David Amouroux (LCABIE-IPREM/CNRS): david.amouroux@univ-pau.fr

Marc-Antoine Vella (IFEA): mav.vella@gmail.com

Christophe Delaere (ULB): Christophe.Delaere@ulb.ac.be

Oswaldo Eduardo Ramos Ramos (IIQ/UMSA) : roe@kth.se

Mauricio. R. Ormachea Muñoz (IIQ/UMSA) : maurormache@gmail.com

Jorge Quintanilla (IIQ/UMSA): ceedi77@gmail.com

David Point (GET-IRD/UMSA): david.point@ird.fr

Céline Duwig (LTHE-IRD/UMSA): celine.duwig@ird.fr

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).