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Brochot, Hubert Machard de Gramont

► **To cite this version:**

Bruno Lemiere, Pierre Billaud, Stéphane Roy, Philippe Négrel, Stéphane Brochot, et al.. Impact Assessment and monitoring programme in the Subarnarekha river basin (INDIA). 25th International Applied Geochemistry Symposium 2011 22-26 August 2011 Rovaniemi, Finland, Aug 2011, Rovaniemi, Finland. hal-01189703

**HAL Id: hal-01189703**

**<https://brgm.hal.science/hal-01189703v1>**

Submitted on 1 Sep 2015

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## Impact Assessment and monitoring programme in the Subarnarekha river basin (INDIA)

Bruno Lemièrre, Pierre Billaud<sup>1</sup>, Stéphane Roy, Philippe Négrel, Marie Véronique Durance<sup>2</sup>, Stéphane Brochot<sup>2</sup>, Hubert Machard de Gramont

BRGM France

E-mail [B.Lemiere@brgm.fr](mailto:B.Lemiere@brgm.fr) (corresponding author)

Environmental impact assessment (EIA) is the main instrument used by Governments to ensure that environmental management in companies is in conformity with society's environmental objectives. Despite its project-specific applications, the scope can be widened to a regional scale (e.g. a river basin) in view of assessing the cumulative effects of multiple industrial activities on the environment and human living conditions.

Within the Subarnarekha catchment, mines, processing plants and copper metallurgy plants are or were operating since nearly 100 years. In this area where monitoring stations were equipped with data loggers and probes for various physico-chemical parameters. They act as an alarm network covering the mining district, around and downstream of the major point sources identified in the area.

- measuring appropriated parameters used to define the level of pollution, and will lead to a sampling survey for a more precise determination of the contamination.
- accounting for seasonal variations, especially those linked with the monsoon regime,
- performing chemical analyses in the laboratory,
- setting-up a chronological database of the performed heavy metal analyses and also meteorological, hydrogeological, sedimentological and all other specific data considered in the study and showing the time-related evolution of water and soil quality.

The environmental data collected served as a baseline which was previously lacking. The network of sampling stations for all the media as well as the implemented protocols provided the embryo of a basin-wide monitoring system.

The large amount of data collected allowed to synthesise a view of hydro-geochemical processes operating in the basin.

Despite large emissions and widespread impacts, no major issue in connection with health was identified in water or soil. The main issue was the unabated pyrometallurgy air emissions. The heavy monsoon rain and floods act as a natural yearly flushing of accumulated pollution. The solute fraction of the pollution was not detectable due to large dilution, while most of the pollution transfer occurred in water-borne solid form. The impacts of solid transport were recorded until the estuary, 200 km downstream, but most of the accumulation is likely to lie in the Gulf of Bengal.

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<sup>1</sup> Now at KERNEOS

<sup>2</sup> Now at CASPEO