Oral | Symbol S (Solid Earth Sciences) | S-RD Resources, Mineral Deposit & Resource Exploration

[S-RD45_28PM2]New progress of resource geology: global environmental change and element enrichment

Convener:*Mihoko Hoshino(National Institute of Advanced Industial Science and Technology), Kyoko Yamaoka(Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology), Tatsuo Nozaki(Institute for Research on Earth Evolution, Japan Agency for Marine-Earth Science and Technology), Ryohei Takahashi(Graduate School of Engineering and Resource Science, Akita University), Chair:Tatsuo Nozaki(Institute for Research on Earth Evolution, Japan Agency for Marine-Earth Science and Technology), Kyoko Yamaoka(Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology)

Mon. Apr 28, 2014 4:15 PM - 5:00 PM 415 (4F)

From the Archean to Holocene periods, ore deposits formed at sporadic frequency. The genesis of ore deposits are closely related to global geological processes such as plate tectonics, magmatism and climate change. New challenging attempts to understand the element enrichment process in ore deposits and their related global environmental change have been carried out using stable isotopes of transition metals which have been difficult to analyze so far. Such a new application allows us significant progresses in resource geology. In this session, we widely invite various presentations on the formation of ore deposits as well as active discussion. Moreover, the related topics for development of new analytical methods and their applications, and studies on element enrichment process at various scales (e.g., element unit, mineral unit, global tectonics and climatic change) are highly welcome.

4:45 PM - 5:00 PM

[SRD45-P01_PG]Upgradation of silica rich fluvial sands of Bangladesh: Proposals for alternate uses

3-min talk in an oral session

*Mohammad RAJIB[1] (1.Bangladesh Atomic Energy Commission / Graduate Student, Grad. Sch. Sc. Eng., Saitama University)

Keywords:Fluvial Sand, Bangladesh, Silica, Heavy Minerals, Capital Dredging, Artificial Islands

Major rivers of Bangladesh are carrying billions of tons of sediments from the Himalayan mountain range from the north, forming bars almost on every river. These bars inundate in floodwater every year, eroding some sediments as well as depositing more. Thus, almost all the rivers are getting filled with the sediment in course of time. The government of Bangladesh has undertaken a mega plan for Capital Dredging, for raising navigability of the main and important rivers across the country. But there is not enough space to keep those dredged materials. Hence, most of the time, the dredged materials are thrown only in the vicinity of dredging area. In course of very short time, those materials eventually return back to river bed with the precipitation and surface runoff. This makes wastage of time and money.The river sediments are rich in silicate mineral, mainly quartz and feldspar, along with others, like heavy and micaceous minerals. Quartz (SiO_2) is the raw material for glass production. River sands of Bangladesh also contain some heavy minerals like magnetite, ilmenite, rutile, zircon, garnet, leucoxene, pyroxene etc., and some Mica group minerals like muscovite, biotite, chlorite etc. Industrial use of these minerals are widely accepted. Upgradation of river silica by some physical separation procedures like density, magnetic and electric separators, and chemical composition revealed from X-ray fluorescence analysis shows that 60-70% silica of river sediment can be easily enriched up to 94%. Very low amount of Fe, Al, Ca, Mg and absence of Cr and Ti indicates the probable use of this upgraded silica as glass

©Japan Geoscience Union

producing sand. For industrial use, advance research is necessary for potential use of such silica for silicon extraction or other silicon products e.g. silicon chip, if the upgradation can be reached more than 99%. The heavy and magnetic minerals associated with silica also can be used economically as by-products of the process. Mining of this sediment from the rivers will increase the navigability of the rivers. As dredging is a must in almost every river of Bangladesh, the mining will work as alternative work of dredging, saving huge amount of money to be spent for dredging. This will also lessen the risk of dangerous flood problem of the country. Moreover, since fluvial sands has been used as earth filling materials for long time and is suitable in many technical aspects, potentiality of using such sediments for artificial islands can be thought. Japan has been implementing several artificial islands where materials like solid waste, soil from mountains are mostly used as filling materials which are not always environment friendly. Feasibility study for using bulk fluvial sand from Bangladesh as earth filling materials for future artificial islands of Japan can a better alternative. This will decrease the risk of potential environmental hazards that can be created from solid waste or hill-cutting. Use of dredged materials from Bangladesh will help decreasing environmental hazards like floods too. Economical sustainability can be achieved through such reduction of hazard risk.

©Japan Geoscience Union