

## First finds of 'Alloclasite' (Fe,Co,Ni) AsS in Ni sulphides of Bangur Gabbro, Orissa, India

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The diarsenides and sulfarsenides of Fe, Co and Ni have a widespread geological occurrence; they exhibit complex paragenetic and compositional relations, and are commonly associated with economically important minerals, such as PGM and gold. We found mineral phase consist of enriched amounts of (Fe, Co, Ni) (As, S)<sub>2</sub> phases in Ni-S phases of Bangur gabbro in Orissa. The age of Bangur Gabbro is ~3.1 Ga. The eastern part of the Indian Shield is composed of a high-grade metamorphic terrain known as the Chhotanagpur Craton in the north and a granite- greenstone terrain known as the Singhbhum Craton in the south. The latter is mainly composed of several granitoid batholiths, which are largely surrounded and intervened by supracrustal rocks. Both Bangur and Baula (21°15'38' to 21°16'55' North and 86°19'14' to 86°20'10' East) in the eastern part of Indian shield have been studied earlier by earlier workers [1], but petrological data (i.e. magma evolution and ore forming processes) are scanty. We report here the presence of mineral phase consists of (Fe, Co, Ni) (As, S)<sub>2</sub>. There is complete solid solution series exist between alloclasite- cobaltite- gresdorffite. The observed assemblages and solid solution agree well with experimental data on Fe-Co-Ni-As-S system.

[1] Mondal, S.K. (2009) *J Geol Soc India* **73**, 36–51.

## Aerosol optical properties and direct radiative effect over India based on satellite remote sensing measurements

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Aerosols affect Earth's radiation budget directly by scattering and absorbing solar radiation, and indirectly by modifying the microphysical properties of clouds. However, large uncertainties still exist in current estimates of the aerosol effects on climate, mainly due to aerosols strong temporal and spatial variation (e.g. [1]). India is one of the world's most populated countries. Along with the continuously increasing population and economic growth the increase of the anthropogenic pollutants is evident. Large emissions of aerosol and precursor gases transported from these regions can have significant impacts on air quality and climate on both regional and global scales.

In this work a measurement-based approach is applied to study the aerosol optical properties and to estimate the aerosol direct radiative effect over India. To assess this, observations from satellite instruments, such as AATSR (Along Track Scanning Radiometer onboard ENVISAT) and CALIOP (Cloud-Aerosol Lidar with Orthogonal Polarization onboard CALIPSO) are used along with a radiative transfer code. The data consists of observations between 2006 and 2010. Preliminary results show e.g. that over areas with elevated aerosol optical depths the fine particles can account for over 80% of the total aerosol extinction.

[1] Yu, Kaufman, Chin, Feingold, Remer, Anderson, Balkanski, Bellouin, Boucher, Christopher, DeCola, Kahn, Koch, Loeb, Reddy, Schulz, Takemura & Zhou (2006) *Atmos.Chem. Phys.* **6**, 613–666.