Inventory of particulate matter from all possible major sources for air quality forecasting during Commonwealth Games 2010 in Mega City Delhi

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Mega city Delhi, is facing large urban agglomerations which is one of the largest urban concentrations in South Asia and a fast growing economic center. Adverse impact of air pollution on human health, welfare and ecosystem is a key environmental problem in Indian mega cities as well as worldwide. High resolution emission inventory (EI) is one of the important and essential critical input to air quality modeling and should be as latest as possible. As part of the System of Air quality Forecasting and Research (SAFAR) project developed for air quality forecasting during the Commonwealth Games (CWG) – 2010, a high resolution emission inventory of PM_{10} and $PM_{2.5}$ have been developed for the mega city Delhi for the year 2010. The comprehensive inventory involves detailed activity data and developed for a domain of 70km×65km with a 1.67km×1.67km resolution covering Delhi and surrounding region using Geographical Information System (GIS) based statistical modeling. Developed high resolution EIs of PM_{10} and $PM_{2.5\ for}$ the air quality forecasting includes the technological specific activity data for different sectors were collected from primary source through one year field campaign as well as from secondary source which is first of its kind of attempt have been made in this work not only to fill the gap but also improve the understanding, uncertainty and accuracy of inventory.. It has been found that total emission of PM_{10} and $PM_{2.5}$ over the study area is found to be 236 Gg/yr (as shown in Fig.1) and 94 Gg/yr respectively. The contribution of windblown road dust is found to be as high as 131 Gg/yr for PM_{10} which is unusual. The relative contributions of different sectors are discussed with possible target for mitigation.

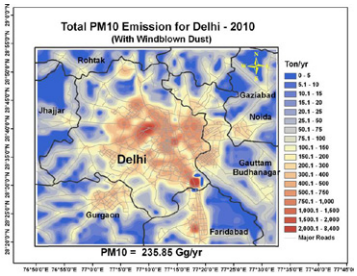

Figure 1: PM_{10} emission from different sources over Mega city Delhi.

Positive Ce anomalies and U-enrichment in Archean volcanics: Implications for oxygenated oceans

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Inference of reducing conditions in the Archean are mostly based on local evidence such as paleosols. Accordingly, new data from the scale of ocean basins is presented. Boninites in unweathered volcanic sequences of the 2.7 Ga Gadwal greenstone terrane, Dharwar craton, India, record systematic positive anomalies of U relative to Th on primitive mantle normalised diagrams, where Th/U spans 0.9-2.1 versus ~ 4 in tholeiitic basalts [1]. Such patterns are present in Phanerozoic forearc boninites where oxygenated fluids are released from the subducting slab into forearc mantle wedge. Adakites, interbedded with pillow basalts, of the ~ 2.6 Ga Hutti greenstone terrane, Dharwar craton, record Ce/Ce* ~ 1.2-1.3 with Th/U ratios <4 consistent with additions of Ce and Th from oxygenated ocean waters. Systematic positive anomalies of Ce, where Ce/Ce* spans 2.1 to 11.4, are present in basalts and rhyolites of a 2.9 Ga submarine volcanic sequence, Murchison Province, Western Australia; these are true Ce anomalies as Pr/Pr*<1. These extreme anomalies are attributed to a stratified ocean, with oxygenated surface waters but reduced bottom waters, in which Ce^{4+} was sequestered, then co-precipitated with Fe-, Mn-oxides and hydroxides distal to a submarine hydrothermal system that generated the Golden Grove Zn-Cu VMS deposit. Archean BIF of the Dharwar craton preserve negative Ce anomalies, complementary to the positive anomalies in volcanic sequences. Collectively, these observations, at the scale of ocean basins, preserve the record of an oxygenated marine environment ~ 400 Ma before the so-called great oxidation event (GOE) at ~ 2.4 Ga.

[1] Manikyamba *et al*.(2005) *EPSL* **230**, 65–83.