

## National Award for Woman Scientist

### Prof. C. Manikyamba



Prof. Manikyamba is well acquainted with the Indian geological scenario covering various cratons and has conducted extensive field & laboratory studies in various parts of Indian subcontinent, by focusing attention on different aspects of Igneous and Sedimentary geochemistry, isotope geochemistry, geochronology, greenstone belt evolution, plate tectonics, crustal evolution, mineralization including gold and PGE.

Pioneering studies were carried out by her in Precambrian to Phanerozoic terranes including the Archean Dharwar, Singhbhum, Bastar and Bundelkhand Cratons, Proterozoic Cuddapah basin, Cretaceous Traps-intertrappeans, Phanerozoic clays and coal beds of Krishna-Godavari Basin.

She has documented gradual evolution of mantle plume processes into subduction zone magmatism from Paleo to Meso-Neoproterozoic times and its connection with the thermal evolution of mantle beneath the Dharwar Craton. Through the geochemical studies she has shown the transition of geodynamic process from intraoceanic island arc to active continental margin from eastern to western sectors of Dharwar Craton which collectively contributed to the continental lithospheric evolution crust generation process during the Precambrian times in the southern peninsular India.

Her studies on the Precambrian banded iron formations (BIFs), manganese formations and stromatolitic carbonates, documented the role of hydrothermal, terrigenous, biogenic activity, Fe-Mn-gold mineralization and the interaction of lithosphere-hydrosphere-atmosphere and biosphere. Recent identification of crystalline and poorly crystalline graphite in the BIFs and their carbon isotopic systematics endorses the Archean biogeochemical processes. Volcanic and sedimentary rocks from different greenstone belts of Dharwar craton such as Sandur, Penakacherla, Gadwal, Hutti, Sigegudda, Jonnagiri, Kadiri, Veligallu, Tsundepalli, Bababudan, Chitradurga, Shimoga and Kudremukh were studied and reported many new rock types. Boninites, Nb-enriched basalts (NEB), high Mg andesites (HMA), Na and K-adakites, Ti-enriched komatiites, arc picrite-shoshonite-leucitites, sediment in-fill volcanic breccia etc. were first reported, explained their genesis through various mantle processes and the results published in peer reviewed international journals which were not reported earlier from India.

She has studied the genesis of iron and manganese formations (BIFs, BMFs), redox potential of proto-oceans, Archean transgression-regression processes; identified granular iron formation and potential zones of gold in various greenstone belts besides, the Precambrian biogeochemical processes through stromatolitic carbonates and carbonaceous shales of Dharwar Craton and Proterozoic Cuddapah basin, south India. Boninites were reported for the first time documenting the oldest subduction zone magmatism from the Older metamorphic Group (OMG), Iron Ore Group (IOG) and Malangtoli lavas of Singhbhum Craton of eastern India. Documented the origin of mafic-ultramafic-felsic magmatism through plume-arc accretion from the Mouranipur, Babina, Lalitpur, Koti, Pura, Saprar, Dhaurra and surrounding areas of

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Bundlekhand Craton. Zircon U-Pb geochronology and geochemistry of Pitapani basalts was studied for the first time along with Bijli rhyolites and Dongargarh granites which indicated the coeval tectonic and magmatic episodes from the Central Indian Bastar Craton. In-situ eruptions in the east coast of India during Cretaceous times has been documented from the Rajahmundry Traps, besides, the geochemistry of Permian Barakar coals from the Sattupalli coal mine of Godavari Valley and the Paleozoic, Mesozoic, Cenozoic sediments of Krishna Godavari Basin are noteworthy contributions from east coast of India.

Dr. Manikyamba's outstanding research in the field of geochemistry has led to the identification of several new rock types within the ancient Indian cratons. Her first report of "Boninites" from the Archean greenstone terranes of Dharwar and Singhbhum Cratons, India are very significant, documenting the ancient subduction processes and gold potentiality. Her innovative contributions include Archean-Proterozoic biogeochemical processes, origin of life, its relationship with the iron and manganese deposits and its role in the deposition of gold in the sulphidic banded iron formations. Her cutting edge research reported several new lithounits of Archean age, discussed on the crustal growth, metallogeny and the evolution of Indian lithosphere that added a new domain of understanding in the geoscience fraternity. Under the continuous process to motivate young researchers, several students from different universities in the country are being nurtured under her guidance, imparting training in field work, analytical techniques, data interpretation, publication of results, who are being moulded to take the lead for future growth of Earth Sciences in India. Dr. Manikyamba's outstanding publications testify her noteworthy contributions that have significant impact on basic and applied aspects of Precambrian Geology, geochemistry and mineralization.

In recognition to her outstanding contributions in the field of Geoscience and Technology, Ministry of Earth Sciences (MoES) honours Dr. C. Manikyamba with the "National Award for Woman Scientist" for the year 2019.