Geochemistry and origin of ferruginous nodules from the weathered gneissic rocks of presently subarid southern India Mysore plateau

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Fe nodules developed within the weathered gneisses of presently semiarid regions of Mysore plateau of southern India has been studied for their geochemistry including chemical speciation. It has been found that the nodules originated by the replacement of kaolinite by goethite or by its precursor minerals. This implies that the study area must have gone through a humid phase prior to the present aridity. The changing local geodynamic situations and the proximity of the study area, having Fe nodules, to the humid regions of Western Ghats (<100Km) suggest that evolving landscapes of this region could have affected the climate locally. The trace elements distribution in the nodules was mainly controlled by manganese phases in the nodules, whereas during weathering they were associated with amorphous Fe and Mn phases, occurring as coatings on resistant minerals. The rare earth elements (REE) geochemistry of the weathering profiles and nodules developing on the gneisses suggest that REE were mobilized from weathering system and reprecipitated with the minerals of the nodules. We suggest that the positive Ce anomaly with the nodules is due to the decoupling and concentration of Ce with the nodules in favorable oxidizing condition. The geochemistry of the soil nodules in this study shows enrichment of trace elements similar to sea nodules but to a lesser extent. Although these nodules may not be economically that important but has great implication to the nutrient transfer from the catchment to the floodplains of Kaveri as discrete nodule phases. In the anaerobic environments of the flood plains they could become a source of the nutrients through microbial mediation.

Geochemical landscapes of Alaska

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Geochemical patterns are presented for 23 elements, ash yield, and pH in soils and other unconsolidated surficial materials from 265 collection locations throughout Alaska. Originally published in 1988 these ultra-low density data (approximately one sample per 6,000 km^2) are now interpreted based on landscape geochemical principles (such as the role of regional soils groups, climate, and vegetation) that influence observed areal patterns. A 5-division ecoregion classification system is used to evaluate feldspar chemical weathering processes and to examine relations among climate (mean annual temperature and precipitation) and soil properties (chemistry, pH, and organic matter). Principal components analysis of these climatic and soil properties resulted in 5 factors that explain 77 percent of the total variance in the data.

Factor	Eigen-value	Percent of Total variance explained	Cumulative percent
1	5.37	34	34
2	2.08	13	47
3	1.97	12	59
4	1.76	11	70
5	1.04	7	77

The factors were identified as (1) clay or reactive oxides, (2) physiographic or latitude, (3) soil organic matter, (4) carbonate and soil ion exchange, and (5) soil potassium feldspar. These data should prove useful in assessing geochemical baselines and interpreting geochemical landscapes to identify broad regional patterns.