

TRACE ELEMENTS OF CONTINENTAL AND ESTUARINE WATERS IN AN INTERTROPICAL BASIN (THE BANDAMA RIVER IN THE IVORY COAST). By J. Lecolle, F. Lenoir, Ph. Mathieu, C. Monnet, J.Ph. Mangin, Université de Nice, Parc Valrose and ORSTOM, 24 Rue Bayard, Paris.

During six years 2,200 samples of water and suspensions were taken from a 100,000 km² intertropical basin, in part from granitic savanna and in part from schistous forest in the Ivory Coast ; the sampled stations covered the whole cycle of natural hydrochemistry : rain, initial drainage of the soils, gullies, principal river (Bandama) and its estuary. Each sample was analyzed for 19 oligoelements. The work, due to the idea of one of us (J.Ph.M.) was supported by the French ORSTOM.

1) The rain water in every zone is essentially composed of Fe (18 µg/l), Al(6), Ti (2), Cu(2) and Mn(4) ; there was more Sr in the forest rain water(7,6) than in the Savanna(3). Due to the wash of the forest canopy, Fe, Al, Li, Rb, Sr and Ba increase (more Rb and Li than Sr and Ba); among transition metals only Ni and Cu seem supplied by vegetation.

2) Such rain water, washing the sampled stations soils, charges itself with more Ti (38), Fe(370), Al(220), V(4) and Cr(5) in granitic savanna than in schistous forest which gives more Sr (120), Ba(30), Ni(5), Li(4), Cu(4) So, knowing the geographical origin of the water of Bandama, we are able to foresee the concentration of elements for a given season. For the most part the initial run-off

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is more heavily charged; the highest concentrations in the principal river are observed in when it rises; then the values decrease until the low-water period. Therefore, the process of solution by superficial waters appears more important than in the ground water supply.

3) The form in which oligoelements are transported depends on their origin: from the granitic savanna environment, all elements, except Sr, are carried with the suspension load which is richer in Ti (> 3000 ppm), V(90), Cr(130), Cu(45), Ga(50) and Pb(50), than in the schistous zone; the same for Co(10), Mo(10), Li(30) and Rb(60). On the contrary, schistous soils give more Mn(220), Zn(90), Sr(60) and Ba(150). The dissolved form prevails from the schistous forest environment. In the Bandama river, Ti and Mn are carried chiefly in a suspension load, but Sr and Ba (and, to a lesser degree, Li and Rb) are transported mainly in a dissolved form.

4) In the estuarine environment the continental oligoelements (Ti, V, Cr, Mn, Fe, Al) are mixed with the marine ones (Li, Rb, Sr, Ba, Mo, B), but the river provided such a quantity of Ni, Cu and Pb that these elements are only slightly more abundant in sea water than in estuarine water.

Thus, the migration of oligoelements within the cycle of natural water was followed through two kinds of substratum, and two types of vegetation and seasonal hydrological variations. We hope these data are useful; they will be published in detail in forthcoming papers.