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CALCIUM AND SULPHUR IN RAIN WATER AT COASTAL REGION

Miyake (1948) analysed sea water, fog water and rain water at different places in Japan and found that relative amounts of calcium and sulphur in precipitation water were much larger than in sea water. He has suggested that such variations can be due to the separation of salts during the process of evaporation of sea sprays. Water droplets coming from the sea evaporates in the atmosphere. In the course of evaporation it is highly probable that some salts having smaller solubility, such as calcium sulphate, separate out from the solution forming stable aerosol. Other salts with high solubility and of hygroscopic nature are easily precipitated as liquid particles having larger diameter than the aerocolloid.

The above may be further explained as follows—Whereas CaSO_4 is only slightly soluble in water, and separates quickly from water droplets to form a stable aerosol, calcium chloride, sodium sulphate and magnesium sulphate are highly soluble. So in the atmosphere, calcium and sulphur derived from the sea water will be present largely as CaSO_4 , CaCl_2 , Na_2SO_4 and MgSO_4 will remain in solution and will be precipitated back. If we measure relative amounts of calcium and sulphur in rain water near the coast (thus avoiding other sources of sulphur in land) we should get the calcium—sulphur ratio agreeing with the theoretical value of CaSO_4 .

This idea has been tested from some data available in the literature. The theoretical value of SO_4/Ca (concentration of sulphate/concentration of calcium) amounts to 2·4. Miyake's data for rain water give the value $2\cdot16/0\cdot96=2\cdot25$ which is very close to the theoretical value.

Eriksson (1952), in his review "Composition of atmospheric precipitation" has given the ratios of Cl/S and for Ca/Cl for a large number of stations. The Ca/S ratios calculated from the above are given in Table I.

TABLE 1

	Distance from the sea (km)					
	0·44	2·28	3·0	5·6	48·0	86·0
Ca/S	1·34	1·19	1·17	1·05	1·15	1·16

The above values are quite close to the theoretical value for Ca/S in CaSO_4 which is $40/32=1\cdot25$. These results, therefore, support the suggestion put forward by Miyake.

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REFERENCES

- Eriksson, E. 1952 *Tellus*, 4, p. 284.
 Miyake, Y. 1948 *Geophys. Mag.*, 16, p. 64.

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