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AHW30-11 Room:101A Time:May 22 14:00-14:15

Diffusion pattern of red soil runoff on a bay reef flat, Okinawa-jima Island, using delta13C and delta15N.

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In Okinawa, sudden farmland development of sugar cane and pineapple advanced around from the 1972 Okinawa Mainland Reversion, and red soil runoff was with the times to accept an environmental problem critically here. In 1994 the Okinawa Red Soil Flowout Prevention Regulations were established, but a red soil runoff is still observed at the time of the heavy rain at a river and the shore. Therefore, We need to evaluate carbon of the land origin deposits observed in boring cores and sea bottoms to contribute somewhat to environmental estimation improvement.

Haneji Inland Sea is a rare case of inland bay environment in Okinawa. We collected the outer layer deposits of the dozens of centimeters thickness on two ca. 350 m long vertical longitudinal sections during the low tide of the summer of 2011 in the southern tidal flat of Yagachi-jima Island. We used GPS and a total station for surveying.

Almost all land source deposits, which spread out in this tidal flat, are supplied from Yagachi-jima Island where cane fields spread through. Hermatypic coral does not inhabit near here, but a bay reef flat exists beneath this tidal flat from former air photos. The upper fine sandy layer is ca. 20 cm thick, and the lower gravelly layer is composed of mollusk shells without matrix sand. Sand ripples are well developed on the tidal flat. The upper sandy layer is well sorted and shows planer or trough laminations. The mud parts were observed in form of mud drape. We mainly present the stable carbon/nitrogen isotope ratios of these mud sediments.

We show the results of research of this stable carbon isotope ratio next (an attached figure of reference). The cross axis on the charts shows the distance from the coastline.

Please refer to a lower chart below. The most landward sampling point was located in distance of 21m from the coastline, and the result of a measurement of the delta 13C was -19.6 permil in a red soil layer covered by the sandy layer more than 10 cm thick. The isotope ratios of the sandy layer increase as leaving the coastline. One logistic curve was recurred (0.9652 decision coefficient), and converged to -9.8 permil at approximately 500m.

Please refer to an upper figure next. Stable isotope ratios measured from the deposits are concerned to reflect mixing ones between land water mass (L) and seawater mass (S): alpha L + (1-alpha) S, and are expressed as (-19.6) alpha+ (-9.8) (1 - alpha). In this upper figure, a logarithm regression curve was obtained. As a matter of course, the land source sediment disappears at approximately 500m. For reference, the -9.8 permil value accords with adhesive alga along the shore.

As supposed from particle size distributions and sedimentary structures, the distribution tendency of the stable carbon isotope ratios provided here shows dilution's and diffusion's results after red soil was supplied to the sea area till now. In other words, it may be said that the environment where red soil is, so to speak, continuously supplied brings about this result.

There was much weight about some samples, and a spectrum had got out of the scale, and it was totally three points among seven points, one point from a landward edge and two points from a seaward edge, but nitrogen isotope ratios delta 15N are all 5.7 permil. This may show the specific possibility of the basin in the origin of the red soil outflow and may divide tongues or aprons of deposits in a bay or boring core.

Keywords: red soil runoff, bay reef flat, particle size distribution, stable isotope ratios of C and N, Okinawa's Haneji inland sea

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