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CHARACTERISTICS OF AEOLIAN SEDIMENTS AT JANDÍA ISTHMUS (FUERTEVENTURA)

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The island of Fuerteventura (Canary Islands) is characterised by a nearly arid climate, due to the proximity to the Sahara desert (~100 Km). In the southern part of the island is located the Jandia isthmus, which is with 54 km^2 one of the most important aeolian sedimentary environments in the Canary Islands. This sedimentary deposit is quite complex, due to the different degree of compactation of the sedimentary materials, resulting from the paleoclimatic evolution happened since upper Miocene to the present. Three times, during the Mio-Pliocene transit, the Upper Pleistocene and the Upper Holocene, marine deposits have been originated due to transgressive processes. Each one of these transgressive situations was followed by a coastal progradation, during which the marine deposits became emerged, and dune formations developed. Imbedded in these dune formations there are certain paleosoils with abundant terrestrial fauna and caliche concretions (Meco, 1993).

All these sedimentary deposits are covered by loose aeolian sediments. In certain areas there is a thick and continuous layer of fine sands, while in other areas gravel materials are predominant due to deflation processes. Even on these coarse grained surfaces there are finer sediments able to be blown out. Grain size distribution and carbonate content of these superficial loose materials has been analysed. Since we were focused on the distribution of mobile sediments and its dependence on winds, two sampling campaigns were carried out to take into account the seasonal variations of wind regime. In theory we can expect higher values of aeolian sediment transport in summer time, since trade winds blow continuously to the south at wind speeds higher than 10 m/s, whilst at winter time the wind variability both in direction and intensity, with nearly 15% of calms, results in lower values of the net transport. Nevertheless, Alcántara-Carrió *et al.* (1996) have measured higher transport rates in December 1995 compared with August 1995, but the sand traps used in both occasions were different.

Samples were taken from the top 5 mm of sediments in August 1996 and February 1997 (108 and 132 samples respectively). Each sample was sieved at 0.5 Ø intervals from -4Ø to 5Ø and grain size parameters were computed using both graphic (Folk y Ward, 1957) and moment methods. Carbonate content was measured using Bernard method (Guitian and Carballas, 1976).

Average values of the results from these analysis are listed on table 1, which shows that these loose materials are slightly coarser, better sorted, less negatively skewed and present lower kurtosis in summer compared with the values of winter. This difference is due to the more effective aeolian transport in summer, which affects the grain size distribution. In effect, in summer there is a higher percentage of coarse sands, since the fine and very fine sands are moved away by the trade winds (table 2).

Table 1
Average values of grain size parameters from moment method and carbonate content for the modes of the size distribution

	Grain size parameters (Ø units)				Carbonate content (%)	
	Mean size	Sorting	Skewness	Kurtosis	Mode 2Ø	Mode -2Ø
August 1996	1.35 ± 0.43	1.10 ± 0.55	–0.55 ± 0.89	5.20 ± 2.35	86.29 ± 6.71	61.87 ± 28.91
February 1997	1.44 ± 0.41	1.15 ± 0.49	–1.07 ± 0.96	6.87 ± 4.08	90.71 ± 5.54	64.69 ± 28.19

Table 2
Average percentages of the sediment classes

	Silt	Very fine sand	Fine sand	Medium sand	Coarse sand	Very coarse sand	Gravel
August 1996	0.34	2.59	23.43	45.49	19.26	1.63	7.15
February 1997	0.42	2.90	26.50	46.19	14.89	1.73	7.37

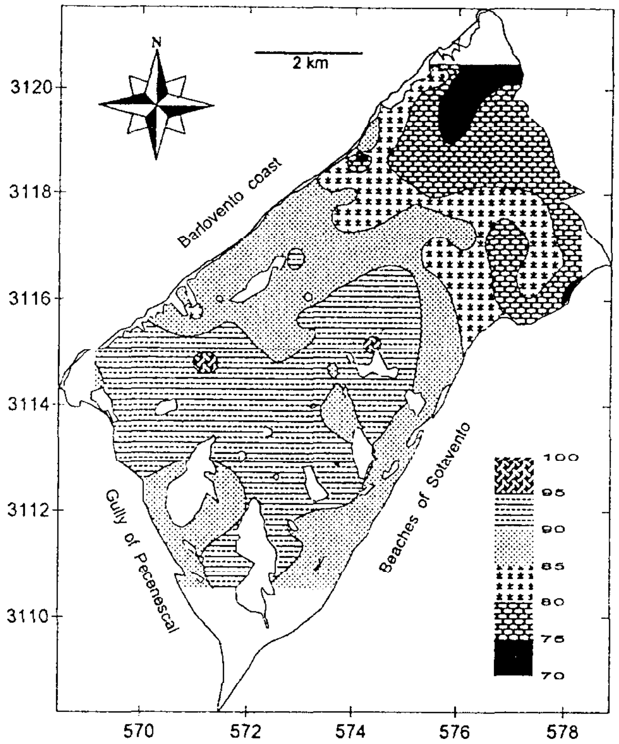

Figure 1. *Distribution of the carbonate content in the 2Ø mode, August 1996.*

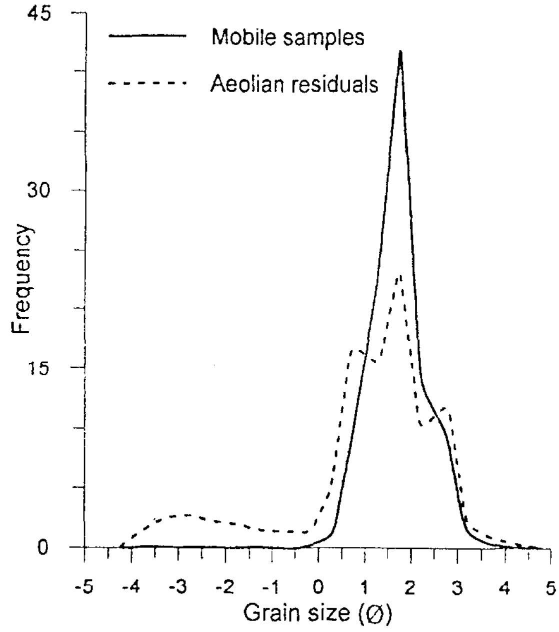

Figure 2. *Average grain size distribution for mobile and residual samples.*

The grain size distribution of most samples shows a mode in 2Ø (medium sands) both in summer and winter, typical of aeolian sands. Nevertheless, in 46% of the samples (40% of the samples collected in August 1996 and 51% in February 1997) there is a much lower mode in -2Ø – -3Ø (pebbles), which seem to be an indication of another subpopulation with a different dynamic.

To check if both modes have a different origin its carbonate content was analysed, indicating that the finer mode has values higher than 70% in any sample (table 1). Figure I shows the distribution of these values on the studied area, where blancks correspond to basaltic hills. On the other hand the coarser mode has a much lower carbonate content with a very important variability from sample to sample. It is due to the different materials in this size fraction: rock fragments like basalt and caliche, terrestrial snail shells and hymenopter nests.

With regard to the sediments mobility, each sample was classified as mobile, stable and residual after representing mean size against sorting and following Gläser criteria (Gläser, 1984). The computation of the average size distribution for each one of these classes shows that mobile samples have the highest peak in the 2Ø mode and no one of them have a second mode, whilst residual samples present the lower mode at -2Ø – -3Ø and three modes in the sand size (figure 2).

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