



## REPLY

### **Reply to: Bruun, P., 1997 Discussion of: Bird, E.C.F., 1996. Lateral Grading of Beach Sediments: A Commentary. *Journal of Coastal Research*, 12(3), 774–785.**

**Eric Bird**

Geostudies  
343 Beach Road, Black Rock  
Victoria 3193, Australia

I was interested in Per Bruun's comments on grain size gradations on the sandy beaches of the Danish North Sea coast, and the principles deduced from his studies. As on Chesil Beach and other laterally graded shingle beaches in southern England, sectors of coarser material are correlated with sectors of higher wave energy. I am still seeking clarification of the mechanism whereby this correlation is achieved. It is agreed that stronger waves can move coarser (as well as finer) material and thus deliver coarser (as well as finer) material to high wave energy sectors, but how is the finer material withdrawn or dispersed from these sectors? Some kind of lateral "edging" from higher to lower wave energy sectors may take place on beaches where waves are breaking parallel to the shoreline, but if so this constitutes "longshore drifting" of a kind distinct from that produced by obliquely-approaching and breaking waves. Experiments

with tracer particles of differing size and colour may be necessary to determine what actually happens.

An explanation for lateral grading on a particular beach must take account not only of longshore drifting, sorting in response to wave energy variations and attrition of sediment particles, but also of the location and nature of sediment inputs. Thus the coarsening of sand in the vicinity of headlands at Hantsholm and Hirtshals may be partly due to the availability of coarse material derived from the eroding cliffs. In a similar way, the evenness of lateral grading on Hawke Bay Beach in New Zealand is disturbed by injections of coarse sediment from a few slumping cliff sectors.

John White, a marine geologist from Hawke Bay, New Zealand, has kindly informed me of some observations on that laterally graded beach, including evidence that sand often moves in one direction and gravel in the opposite direction. I look forward to publication of his research, which will contribute further to the points that Per Bruun and I have been discussing.

---

97046 received and accepted 5 April 1997.