

MINERAL DEPOSITS OF THE COASTAL ZONE AND CONTINENTAL SHELF

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The coastal zone and continental shelf is defined for this paper as the beach and littoral of the oceanic seabeds to the outer edge of the shelf. Mineral deposits are unconsolidated, consolidated, or fluid, and are commonly referred to as placers, hard rock, or dissolved. Unconsolidated deposits include, however, diamonds, platinum, gold, a variety of heavy minerals containing tin, titanium, iron, rare earths, and other metals, sands, gravels, shells, or nodules of silica, calcium carbonate, magnesium carbonate, or phosphorite; consolidated deposits may contain any of the minerals found in bedded or hard rock deposits on land; and fluid deposits may be fresh water, mineralised hydrothermal fluids, or seawater itself. Also found in the coastal and shelf environment, but not further discussed in this paper, are solid hydrocarbons including coal, tars and clathrates. The potential for sustainable development of any deposit will be influenced by its economic value per unit volume of material in place, the physical and chemical nature of the deposit itself, the environment in which it is found, both natural and socio-political, and the technology available for removal and separation of the saleable constituents. Historically, the mining of marine minerals has been confined to beach or near-shore, shallow water, alluvial deposits: bedded or vein deposits mined underground from shore entries; and coastal seawater plants. The potential for future developments in deeper water farther offshore is enhanced by improvements in technology, more benign effects on the environment, and indications of richer deposits of some minerals near the shelf edge.