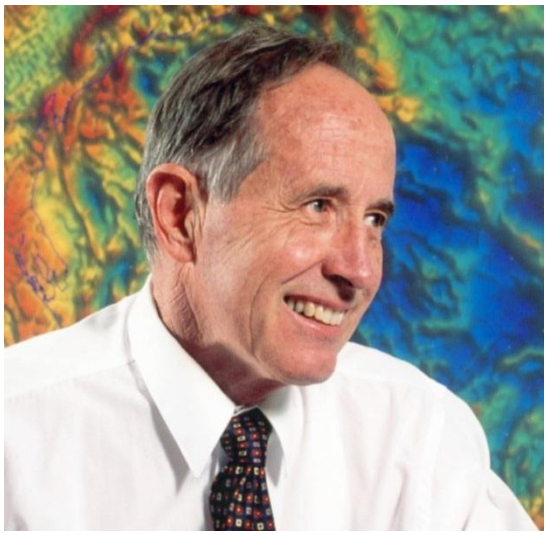
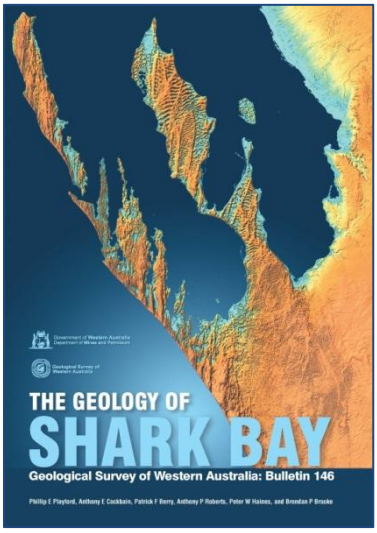
Dr Phillip Playford. The Geology of Shark Bay





Dr Phillip Playford was born in Perth, and holds BSc. (Honours) and Honorary DSc degrees in geology from the University of Western Australia, and a PhD from Stanford University. He is a former Director of the Geological Survey of Western Australia and is well known as both a geologist and a historian. He was rewarded by the WA Government as a primary discoverer of the *Zuytdorp* wreck, the first Dutch wreck to be found and identified in Western Australia. His book "Carpet of Silver; the wreck of the *Zuytdorp*" received a Premier's prize for literature, and another, "Voyage of discovery to Terra Australis by Willem de Vlamingh in 1696-97", was short listed for a Premier's award.He has received many honours and awards, including the Medal of the Royal Society of WA, and a Member of the Order of Australia (AM), for his contributions to the geology and history of Australia.

Summary
Shark Bay is world renowned for its geology and human history, and consequently it was the first place in Western Australia to be designated as a World Heritage Area. It was also the first part of WA to become known to Europeans, through the visit by the Dutch skipper, Dirk Hartog, on 25 October 1616. He landed at the north end of what would become known as Dirk Hartog Island, and was followed by a succession of famous Dutch, French, and English navigators during the 17th and 18th centuries.

The most renowned biological feature of the Shark Bay area is the occurrence, in Hamelin Pool, of living and fossil stromatolites, the best examples known in the world of these primitive life forms. They flourish there because Hamelin Pool is hypersaline, resulting in a lack of animals that would otherwise graze on cyanobacteria that build stromatolites. The lack of animals there mimics the situation that prevailed on earth during the Precambrian, when stromatolites flourished because animals had not yet appeared. The hypersalinity at Hamelin Pool is due to the presence of a shallow bank, known as the Faure Sill, across the northern entrance to Hamelin Pool.

Another prominent aspect of both Hamelin Pool and L'Haridon Bight is the Hamelin Coquina, which is made up of enormous numbers of a small bivalve, *Fragum erugatum*, that hosts symbiotic zooxanthellae. Those are photosynthetic organisms that provide their host with energy through the products of photosynthesis. The peninsulas and main islands of Shark Bay are underlain by anticlines that folded during Pleistocene and Holocene times. Uplift of one island (Faure Island) can be shown to have amounted to 14.5 m during the past 3500 years. The dominant geomorphological feature of the west side of the Shark Bay area is a line of precipitous cliffs, known as the Zuytdorp Cliffs, that are interpreted as marking a Holocene fault-line scarp. This fault had a maximum vertical

displacement of more than 250 metres. Most of the land surface of the Shark Bay area is occupied by sand dunes, many of which developed when sea level was lower, and the prevailing southerly winds were stronger, during the last glacial period of the Pleistocene.

Another remarkable feature of the geology of this area is the occurrence there of huge tsunami deposits. They consist of blocks of calcrete (limestone), weighing up to 700 tonnes, that were thrown up by at least two mega-tsunamis during the last few thousand years. Similar deposits have also been identified during this study on Barrow and Legendre Islands. Mass slumping of sediments, possibly initiated by earthquakes, is deemed to be the most likely cause of these tsunamis. On the other hand, tsunami deposits around the Kimberley coast have probably been initiated by strong earthquake activities along the Sunda and Banda Arcs of Indonesia.