Tides 1B

The daily fluctuations in sea level, known as tides, have a profound influence on the animals and plants inhabiting South Africa's shores. They are also important for human users of the coast, as low tide allows better access to the shore for activities such as bait collection or beach driving, while boat-launching is best done at high tide. For this reason, the Naval Hydrographer produces tide tables each year, which detail the state of the moon and the predicted times and heights of low and high tides.

How tides work

Tides are the result of the gravitational force of both the sun and moon on the earth's oceans. The moon has the greater influence as it is much closer to the earth than the sun, so the tides are said to follow a lunar cycle.

The moon's gravity pulls a "bulge" of water towards it, with the result that high tides occur on the side of the earth closest to the moon. On the opposite side, the water bulges out because of centrifugal force as the earth and moon spin around one another. Since the earth rotates, each point will experience two high tides per day – one due to gravitational pull and the other due to centrifugal force. As the water bulges out in these areas, it is drawn away from others, causing low tides there.

The moon takes 28 days to orbit the earth, moving a little further round the earth each day. High tides therefore occur about 50 minutes later each day, or 25 minutes later each tide.

Spring tides are extra-high and -low tides that occur every two weeks throughout the year, at new and full moon. At these times, the sun, moon and earth are in line with one another, and their combined gravitational pull creates an extra-large "bulge" at high tide. A greater area of shoreline is exposed at spring low tides, which in South Africa occur at about 10 am and 10 pm.

Between the spring tides are neap tides, when the difference between high and low tides is not as marked. Neap tides occur during the first and last quarters of the moon, when the moon is at right angles to the sun and their gravitational pulls cancel each other out.

The tidal range – the distance between the low- and high-water marks – varies enormously from one part of the world to another. In the Bay of Fundy in Canada, the spring high tide is 15 m above the low-tide mark, while a range of 6-12 m is not uncommon in parts of the British Isles and north-west France. Tidal range is lowest in enclosed seas such as the Mediterranean, where it seldom exceeds half a metre. In southern Africa, tidal range is usually 1.2-2.5 m.