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MUDLUMPS IN THE COORONG

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Reports of previous gas seepages along the eastern side of Younghusband Peninsula resulted in an inspection along the Coorong in the vicinity of Salt Creek during April of 1973 (Fig. 1). 73-651

Several "mud anticlines" (Photos 1 & 2) were observed along an 8-10 kilometre stretch on the lee side of the peninsula in the region where Brown (1969) had previously described deformation structures. These mud anticlines or deformation structures are similar phenomena to occurrences in the Mississippi River Delta U.S.A. where they formed obstacles to shipping and were appropriately named MUDLUMPS.

The definition in the American Geological Institute glossary states that mudlumps are "swellings of bluish-grey clay forming small islands of an acre or more with a height of 5 to 10 feet above sea level, formed at the mouths of the Mississippi; apparently caused by pressure of surface deposits on buried clays". The diapiric structures in the Salt Creek area differ in some respects from the definition but appear sufficiently similar to warrant being named MUDLUMPS.

The Coorong Mudlumps

Brown (1969) has adequately described the structure of the Coorong Mudlumps. This paper emphasizes the associated features and compares the mechanism of formation with the Mississippi mudlumps.

In the Coorong the mudlumps appear as dark grey to black elongated dome-like islands of mud ranging up to approximately 200 metres in length, Brown (1969) and protruding up to 1 m through the Coorong waters.

Where erosion has removed the cap of a dome concentric bedding can be observed with anticlinal dips. The mudlumps are composed of dark green-grey clays containing abundant organic matter, some algal mats, and occasional light grey to off white (?) carbonate bands which display the bedding. The water-saturated clays feel very spongy, both underfoot and

when squeezed gently in the hand. According to Vander Borch (1965) these carbonate-rich sediments are up to 10 feet or so in thickness.

Associated features include natural gas, and fresh water seeps adjacent to many mudlumps. Faulting also is associated with the formation of mudlumps.

Comparison with Mississippi Mudlumps

The Coorong Mudlumps observed were smaller than the Mississippi mudlumps but larger ones may now be covered by the encroaching sands of Younghusband Peninsula.

The composition of mudlumps at both these localities is essentially a grey plastic clay rich in organic material. Both have natural gas associated with their formation but the rate of formation and associated gas composition for the Coorong structures is unknown. The Mississippi Mudlumps contain a methane-rich gas (Shaw, 1913) which escapes at rates up to an estimated 10 cubic feet/hour. They may take from a few hours to several years to form.

Faulting has been observed in both localities by Shaw (1913), Morgan et al. (1968) and Brown (1969) and this increases with maturity of the mudlumps.

The feature which is apparently exclusive to the Coorong mudlumps is the associated fresh water seeps.

Mechanism of Formation

All the features of the Coorong mudlumps can be explained by the mechanism of formation, which is postulated here as being the same as that suggested by Morgan et al., (1968) for the Mississippi mudlumps.

Mudlumps are formed by a pressure differential on buried plastic clays (Shaw, 1913) and in the Coorong area this pressure difference results from load pressures of the advancing Younghusband Peninsula dune sands on the underlying plastic lagoonal clays. When load pressures have built up sufficiently on parts of the peninsula, perhaps after heavy rains which would add considerable weight to the dunes, the surface thin silty and sandy clays of the Coorong Lagoon are unable to contain the pressures. Lateral and vertical movements result and a dome is produced (fig. 2). 73-652 Minor faulting results in order to relieve pressures and faulting increases with size and maturity of the structures.

The Coorong mudlumps appear to be restricted to the lee side of the peninsula. Formation on the seaward side is possible but wave erosion would soon demolish them particularly if formation is slow.

The freshwater seeps adjacent to each mudlumps are related to the formation of each structure. The base of the dune sands next to each mudlumps is raised sufficiently to allow rainwater, seeping through the dune complex, to emerge just above the salty Coorong water, where it can be detected (fig. 2). Elsewhere large volumes of fresh water must be lost to either the sea on the weather side or the Coorong waters on the lee side of the peninsula. As there are a number of seeps (locally called "sucks") in the Salt Creek region of the Coorong, they may reflect the presence of eroded mudlumps, now covered with lighter coloured silts and sands.

Bubbling gas has been reported by local inhabitants but these natural gas seeps have not been observed at the Coorong by the writer. Nevertheless an odour of rotting organic matter was detected when the muds were disturbed and presumably the gas is methane "marsh gas" formed by vegetative decay.

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