

## Salinity estimation by the ratio of bivalve, *Fragum Erugatum*, when the first stromatolite begun to form in Hamelin Pool

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Hamelin Pool is a peculiar environment where the salinity is twice as normal sea, brings inhibited normal organisms, cyanobacteria flourish and stromatolite formation.

This environment is known that salinity had increased by marine regression since 4000 years ago after Flandrian marine transgression, inhibited marine circulation by Faure sill, and low rain fall and high evaporation by semi-arid climate. High salinity is not full requirement for stromatolite formation however it is important factor in this regime. However this salinity fluctuation and the salinity when the first stromatolite begun to form are not known very well.

In this study, based on the report (Berry and Playford 1997) which says the ratio of shell inflation to shell length of *Fragum Erugatum* living sub tidal change by salinity fluctuation, tried to estimate the salinity from sedimentary shells since 4000 years ago.

Sampling location is northern Bay of Flaggpole Landing in southern part of Hamelin Pool. It needed not broken shells for measurement of its size. The samples were decided to taken as possible as southern side of the bay as I had obtained the sediment are classified coarse to find by water movement from advanced research. It is considered that the sedimentary shells at the back of the bay are oldest and the front of the bay are recent ones in chronological order. The sampling locality was thirteen positions. It is going to be taken around 100 shells at one locality, however around 1000 shells were able to measure in total.

In the previous study, it deals with living shells (two shells), the ratio is 0.63 when the salinity is 3.4 permill in normal salinity and the ratio is 0.7 when the salinity is twice as normal sea. This study dealt with dead shells therefore used half of the value 0.31 and 0.35. The result of the measurement was almost same as this report.

The assumed oldest age was 4100BP was obtained by 14C with marine reserver effect. According to Chivas (1990), the first stromatolite in Hamelin Pool was formed during 1250 to 1000 years ago, the salinity showed 60 permill after calculation.

According to the experiment of production of sea grass *Amphibolis antarctica* by D.I.Walker (1985), it decreases dramatically when salinity reached at 58.5 permill. It almost consistent with the value.

Therefore, when the salinity of Hamelin Pool reaches 60 permill during 1250 to 1000 years ago, it is considered that inhibited normal organisms, cyanobacteria flourished and a great deal of mucus trapped and/or bound sand and finally began to form stromatolite.

From the conservation of viewpoint, it is possible to advance that it needs the monitoring of sea level fluctuation and salinity fluctuation. Recently, sea level rise is being said, if salinity will go down under 60 permill takes place, predict the stromatolite will be not formed.