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The *Reef Woman* of the Maldives

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Abstract

A human skeleton was found embedded in beachrock in the Maldives. It was identified as the remains of a woman, died, killed or washed ashore at a former shore at about AD 1150. The shore was at the same elevation as today's shore. Sea rose to about +60 cm, covering the skeleton with coral rubble. Sea fell again to its present position, cementing the shore deposits into beachrock including the skeleton. In sub-recent time, the beachrock was trimmed into a rock-cut platform at sea level of about +20 cm. In the 1970s, sea level fell to its present position, starting to erode a new rock-cut platform at about present high-tide level, by that exposing the old skeleton. The skeleton has come to be known as "*the Reef Woman*" of the Maldives or of Lhosfushi. The skeleton lacks its feet, suggesting that the woman was killed on the beach and the feet cut-off. The age of the bones is calAD 1135 ± 70. Therefore, it seems highly likely that the killing took place at the invasion and takeover of the Maldives by the Muslims in AD 1153. It seems we have cleared up an 864-year old murder.

Keywords

Woman Skeleton, Beachrock, Sea Level Changes, Garaidhoo-Lhosfushi Atolls, the Maldives, an 864 Year Old Murder

1. Introduction

In 1996, M. Zahir and M. Manik found a skeleton in the "reef" bordering the Garaaidhoo-Lhosfushi atolls in the Maldives. The loose parts were collected and brought to Male. In 2001, the present author undertook a proper investigation of the site together with Professor M. Tooley (from the UK). The bone fragments collected in 1996 were placed at our disposal, and brought to Stockholm for further analyses. The skeleton came to be termed "*the Reef Woman*" (Mörner, 2001; 2004).

In Sweden, the bones were examined and dated. In 2003, all borrowed bones

were taken back to the Maldives and deposited at the Centre for Linguistic and Historical Research in Male (Mortensen, 2004).

2. Results

Below follows a description of the observations in the field followed up by the results of analyses undertaken in Sweden at the Institute of Paleogeophysics & Geodynamics.

2.1. Skeleton Found

The skeleton was found by Mohamed Zahir and Moosa Manik in 1996. They collected bones and a big part of the cranium and brought it back to Male. The skeleton was said to be found "in the reef" of Lhosfushi-Garaidhoo, indicating a considerable age. It became known as "*the reef woman from Lhosfushi*". They noted that her feet were missing. A small note was published in the local newspaper (Rasheed, 1996), a copy of which I got after my first visit to Male to initiate our International Maldives Sea Level Project in 2000 (INQUA, 2000).

2.2. Stratigraphy

As soon as I heard about a "skeleton in the reef", I hasten to go there for a proper investigation. Professor Michael Tooley (sea level specialist from UK) came with me. Moosa Manik showed us the site, and we found the skeleton in place (**Figure 1**).

Figure 1. The "skeleton skerry" with the remains of the "*reef woman*" just to the left of the hammer (in the same position in **Figure 2**). Both skerries have a surface cut into a rock-cut platform corresponding to present high-tide level.

The skeleton rests embedded in the surface of beach sand (today cemented), and it is covered by coral rubble cemented into beachrock (as evident from Figure 2). The actual site is a small skerry (Figure 1) between the islands of Garaidhoo and Lhosfushi in the South Male Atoll.

At the shore of Garaidhoo, the beach sand and the covering coral rubble of the "skeleton skerry" grade into an on-shore sand (now cemented) reaching up to about +70 cm (layer 3 in Figure 3). Remains of the beachrock of coral rubble go up to +40 - 50 cm, and are indicative of a higher sea level.

The beachrock on the "skeleton skerry" and along the shore of Garaidhoo is cut into two sub-recent rock-cut platforms; one at about +20 cm, and one at around ±0 cm actively being eroded today (Garaidhoo 1 and 2 in Figure 3).

Along the shore of Lhosfushi, there are 3 stages of beach-ridge formation: the present one, a sub-recent one at +20 cm, and an older one at about +50 cm (1 - 3 in Figure 3).

Our interpretation (Mörner et al., 2004) is that sea level was at about the present level at the time of the death of the "*reef woman*", that sea level rose shortly after to about +50 - 60 cm, depositing the coral rubble, then fell to about present level with cementation and beachrock formation (of the beach sand with

Figure 2. The remains of the "*reef woman*" and their stratigraphic position: the bones embedded in a beach sand, covered by coral rubble. Both the beds were later cemented into a beachrock.

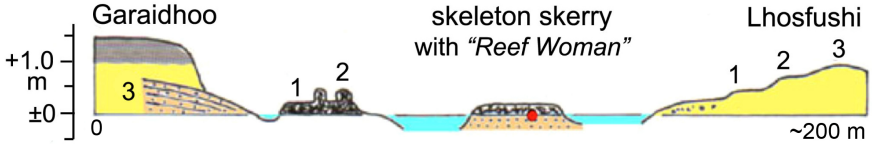

Figure 3. Stratigraphy and morphology at the Garaidhoo-Lhosfushi site with the "skeleton skerry" in the middle (redrawn from Mörner et al., 2004).

the skeleton and the covering coral rubble). Later, in sub-recent time, sea level rose to about +20 cm with rock-cut platform erosion of the older beachrock. Sea level fell to its present position and a new rock-cut platform at present sea level started to be eroded. It affected the "skeleton skerry" and exposed the "*reef woman*".

The stratigraphy and morphology in association with the "*reef woman*" (**Figure 3**) became important points in the reconstruction of sea level changes in the Maldives (Mörner et al., 2004; Mörner, 2007; 2011; 2016; 2017a).

2.3. Osteology

The bones were examined for osteological characteristics by Torstein Sjøvold, professor in Historical Osteology at Stockholm University. He confirmed that it was a skull of a woman. The age range was set as: 19 - 45 years (implying that she was neither a child nor an old woman). The teeth were in good condition. There were no signs of any health problems.

This adds to the problem of the reason of her death. The missing feet suggests a violent death, i.e. a murder with truncation of the feet.

2.4. C14-Dating and Calibration

A piece of bone was C14-dated (AMS) by Professor Göran Possnert at the Ångström Laboratory at Uppsala University. The age was 1225 ± 55 C14-years BP. If the bones would have been of normal terrestrial type, the calibrated age would have been 1161 ± 74 cal.yrs BP. There is a problem, however.

The C13-value of the bone is −14.3‰, which implies a marine isotopic composition. Obviously the woman had lived predominately on marine food. This means that the age obtained must be calibrated for the marine "reservoir effect". We have established that this effect is 350 years (Mörner, 2007; 2011; 2017a). Subtracting 350 years and calibrating for the atmospheric variations in C14-content gives a date of calAD 1135 ± 70.

2.5. Cause of the Death of the Woman

Because her feet were missing, probably cut off, it seems the death of the woman was, in fact, a murder. It seems she was left on the beach, her feet cut off. Normally, our theories would stop at that. The age opens new possibilities, however. The calAD age is 1135 ± 70. We know that there was a violent takeover by the Muslims in the year AD 1153, killing or converting the original Buddhist population on the islands. The age of the *Reef Woman* closely corresponds to the time of this violent takeover.

Therefore, it seems highly likely that the poor woman was a local inhabitant, who was slaughtered on the beach by the invaders. Thus, we may have uncovered an 864-year-old murder.

The other inhabitants of the islands close by seem to have also disappeared, as there were no survivors to bury the "*reef woman*".

3. Wider Sea Level Perspectives

The International Maldives Sea Level project started in 2000 (INQUA, 2000). During the period 2000 to 2005, six separate visits for field-studies were undertaken including two long expeditions in 2001 and 2003 with a large number of international experts.

After a first preliminary report (Mörner et al., 2004), a full report with a detailed sea level curve for the last 5500 years followed (Mörner, 2007; 2011). The submarine part was presented separately (Rufin-Soler et al., 2014). Finally, it was shown that the observations with respect to the sea level changes of the last 500 years were also found elsewhere in the Indian Ocean (Mörner, 2016; 2017a), and even in the Fiji Islands (Mörner, 2017b).

The sea level changes of the last 5500 years include seven oscillations. The sea level changes of the last 1800 years will be highlighted here (**Figure 4**) in view of the observations in relation to the "*Reef Woman*" (**Figure 3**).

The position of the "*Reef Woman*" is in shore deposits at a level of about present sea level. It was followed by a rapid rise in sea level depositing the coral rubble. These changes in sea level from a low in the 12th century to a high in the 13th century (G4) are backed up by 4 C14-dated samples (red dots), one of which refers to the "*Reef Woman*" (**Figure 4**). The elevation of layer 3 in Garaidhoo (**Figure 3**) fits well with a subsequent sea level high on the order of +60 - 70 cm.

During the low level during the 14th and 15th centuries, the cementation and formation of the beachrock is likely to have occurred.

The two stages of rock-cut erosion at Garaidhoo and the Skeleton skerry (**Figure 3**) were formed during the 20 cm higher sea level at about 1800-1970, and the present sea level from about 1970 up to today. Beach-ridge 1 and 2 at

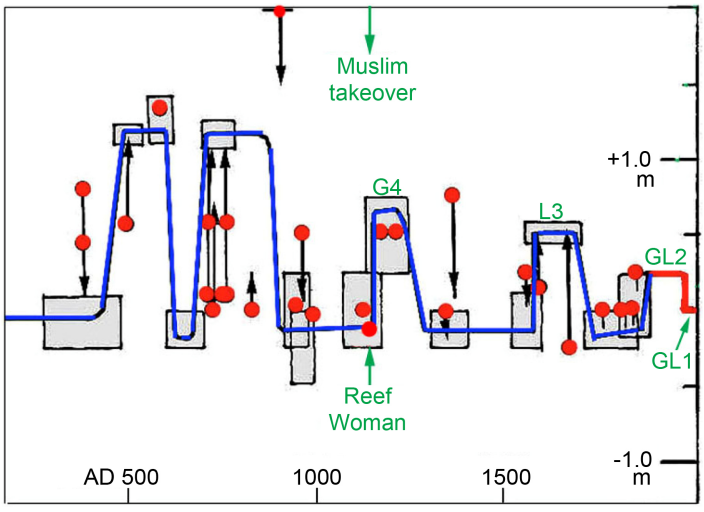

Figure 4. Sea level changes of the last 1800 years with special reference to the position of the "*Reef Woman*" and the Muslim takeover in AD 1153 (redrawn from Mörner, 2007; 2011). Red dots mark C14-dated samples and their relation to sea level (arrows).

Lhusfushi corresponds to the same two levels. The higher beach-ridge (L3) refers to the +50 - 60 cm high sea level in the 17th century (**Figure 4**). It seems significant that these three high level (GL1, GL2, L3) within the last 500 years have been recorded at so many other places not only in the Maldives but even elsewhere in the Indian Ocean (Mörner, 2016; 2017a) and even in the Fiji Islands (Mörner, 2017b).

4. Conclusion

The "*Reef Woman*" was found cemented in old shore deposits. The whole body was found, except for the feet, which were missing (probably cut off). The woman must have been slaughtered at the beach. Her age is calAD 1135 ± 70. This is very close to the age of the violent takeover of the Maldives by the Muslims in AD 1153. Therefore, a causal connection seems very likely, even obvious. It seems we have cleared up an 864-year old murder.

Secondly, the stratigraphic and morphological records documented in the coastal area of the islands of Garaidhoo and Lhosfushi in the South Male Atoll, provide sea level information partly of a rapid sea level rise from about ±0 in the 12th century to about +60 cm in the 13th century, and partly of three subsequent levels of +50 - 60 cm in the 17th century, +20 cm in the 19th and 20th centuries and then a fall to present sea level in the 1970s, which is in full agreement with records from other sites in the Indian Ocean (and even in the Fiji Islands according to new data).

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