

## Dating

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#### Preliminary study on dating Dama Branca (White Lady) dunes barriers in Cabo Frio, Rio de Janeiro, Brazil.

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Many authors attribute to sea level fluctuation in the past the formation of coastal plains in Brazil in dating sea-coast in the region of Cabo Frio, Rio de Janeiro. The sea level fluctuation played an important role in the evolution and formation of Brazilian coastal plains. Dating by any method materials from coastal plain contribute not only to characterize them but also to determine the sea-level at different periods in the Holocene.

The sea-coast of Cabo Frio extending to Arraial do Cabo (a town to the south of Cabo Frio) is dominated by dunes barriers. The dunes along the city of Cabo Frio sea-coast are called actives (modified by wind action) while from exit of Cabo Frio to Arraial do Cabo the dunes are fixed or established with vegetation there growing. The first of these established dunes barriers is known as Dama Branca (White Lady) composed with several sand hills of 10 to 20 meters high.

In this work one of these sand hills were dated using Thermoluminescence and ESR techniques.

As a starting task, sediments from the base was collected introducing horizontally a PVC tube 3 m long and about 3 cm diameter. The sediment accumulated at the end part of the tube (the deepest end introduced) were washed in solutions of H<sub>2</sub>O<sub>2</sub>, HCl and HF to remove organic material, iron and a thin cover of the quartz grains to exclude the alfa radiation contribution, respectively. Then the washed material was sieved to retain grains with sizes between 0.080 and 0.180 mm for TL and EPR measurements of the accumulated dose, D<sub>ac</sub>, using regenerative method in TL case and additive method in EPR case.

The anual dose rate was measured using  $\gamma$ -spectroscopy measurement. Samples were weighed and separated into small packages and a serie of 8 different gamma radiation doses (10 Gy to 80 Gy) were given in order to build a calibration curve.

With TL subtracting residual TL of about 0.15 of non-corrected value, an accumulated dose of about  $9.35 \pm 0.55$  Gy was obtained while with EPR an accumulated dose of about  $9.45 \pm 0.45$  Gy have been obtained. By  $\gamma$ -spectroscopy measurement an annual dose rate of  $D_{an} \cong 0.479 \pm 0.011$  mGy/year was obtained already including cosmic rays contribution. Therefore, we obtained age =  $D_{ac}/D_{an}$  of 19519.83 years for TL and 19728.6 years for ESR.

The obtained age of approximately 20000 years is in agree with the Holocene period, when the sea level fluctuations occurred in the past. This may indicate that the Dama Branca formation is a consequence of this phenomenon. More experiments are being done in order to measure the age along the Dama Branca formation and help the geologists in understanding the formation process of this part of the Rio de Janeiro coast.