3. Methods and Instrumentation

3.1 Field Sampling Methods

Site pits were excavated at three sites in the Bodo Archaeological Locality: BD03-1/1 (52° 08.517' N; 110° 06.695' W), BD03-2/1 (52° 08.517' N; 110° 06.695' W), and BD03-3/1 (52° 08.517' N; 110° 06.695' W) (Figure 3). Samples for analysis were collected at the pit walls at 5 cm intervals using opaque sampling tubes. Approximate preservation of luminescence signal for postmortem exposure was ensured by inserting quartz rods into each sampling point using a RS-230 BGS Standard SPEC portable gamma ray spectrometer. In addition to field luminescence investigations, samples were also analysed in the AirLink size distribution decay counting method.

3.1 Luminescence Measurements with the Portable OSL Reader

A POSL reader system developed by the Scottish Universities Environmental Research Centre (SUERC) was used in this study. The basic components of the reader include a detector head containing a photomultiplier tube which is mounted over a sample stage. Luminescence emission can be measured in the near-infrared and visible range by scanning the wavelength of the excitation wavelength (generally 330-390 nm) and the luminescence is measured in the 370-750 nm range. Where all these variables differ from the usual spectrophotometry, an OSL signal is only delayed for a short time after the sample is exposed to a stimulating pulse of light. After a period of time after exposure, a light or dark stimulus (e.g., exposure to red light) is applied to the sample, and after a second period of time (e.g., exposure to blue light), the light stimulus is neutralized. The difference between the two measurements is the induced OSL signal. This signal is then used to determine the age of the sample.

5. Conclusions

5.1 Sediments in the site's original depositional sequence increase in age with depth. This is consistent with the stratigraphic and luminescence evidence. The site has been disturbed since the last emplacement. The spike in luminescence signal values at the bottom of the profile shows that an older depositional unit lies at the bottom of the sand column. This suggests that the site has not experienced post-depositional mixing. The spike at the bottom of the profile shows that an older depositional unit lies at the bottom of the sand column. The luminescence data show a general increase in signal with depth. This is in both BD03 and post-IR blue OSL signals at around 5 cm correlating with a buried soil and indicating an older eolian episode. The relative signal above and below the buried soil can be used to approximate relative age differences between the two.

References


Acknowledgements

Funding is provided to the Natural Sciences and Engineering Research Council of Canada (NSERC) and Athabasca University for funding through grants in aid.