

08/09/2022

**Statement of Work
For
A Portable Optically Stimulated Luminescence (OSL) Reader
System**

FBMS Requisition No. 40554375

Description/Specifications/Work Statement

Background

The USGS Luminescence Geochronology Laboratory (located in Denver, Colorado) is charged with providing accurate, as quick as possible, and cost-effective means of providing ages on paleoearthquake assessments of major fault systems in the U.S. Often the work within the USGS and, with additional agency partners (such as BOR, BLM, NPS, and various universities), requires field deployment with limited access and time in a trench setting. The Luminescence Lab is a modern dating facility with the largest amount of instrumentation in North America. The lab contains 4 luminescence readers, 2 portable gamma spectrometers, and 1 overworked portable optically stimulated luminescence (OSL) Reader.

The Luminescence Lab requires additional equipment that will complement and enhance its rapid deployment of portable OSL analyses in a trench situation because luminescence dating is expensive, time consuming, and the quality of ages depends directly on chemical and physical parameters that determine if the sediments are suitable for dating. These parameters are often difficult to evaluate in the field and, therefore, many samples are either lost during processing or yield poor quality ages until researchers developed a portable device capable of measuring “raw” OSL signals in the field. This portable device removes many of the uncertainties surrounding the suitability of samples and dramatically increases the likelihood of success.

The portable OSL device does not directly determine an age; rather it allows quantitative examination of OSL properties such as the signal magnitude, signal decay rate, and signal dispersion (related to age uncertainty) in the sampled sediments, all of which are key to developing robust ages. Possession of such a device presents a unique opportunity to avoid collecting samples that contain intrinsic problems such as partial bleaching (incomplete removal of a previous age), weak/unstable signal intensity (leading to less accurate ages), significant statistical scatter in measurements (over-dispersion leading to less precision in the ages), or samples beyond the temporal limit of OSL (>750,000 years). The Luminescence Lab has successfully deployed the instrument in trenches which saves significant research funds and decreases turnaround time during the laboratory sample analyses stage. The minimum time required to perform this laboratory analysis is on the order of several weeks at a potential cost of \$500-\$1000 per sample, whereas the portable OSL device would provide this

information on the order of minutes at \$5 per sample. Ultimately, it allows for more rigorous interpretation of underlying geological processes and their implications to society. However, the device that the lab already has is incapable of keeping up with the number of samples that need to be collected. Adding another portable OSL device to the luminescence dating protocol as a screening device will fundamentally enhance USGS hazards and climate science research in such a manner as to properly inform and protect our nation's existing infrastructure as well facilitate the design of future developments.

Scope

The Contractor shall provide a Portable OSL Reader System as well as user assistance, collaboration, and training to USGS Luminescence Geochronology Lab personnel. The device will be available for use by USGS partners (and will require potential operators to be trained in its use and operation) and staff.

The Portable OSL Reader will allow Laboratory scientists to take the reader to the field, deploy, and rapidly access the most suitable sediment that should be used to obtain ages on past fault movement, leading to accurate reoccurrence predictions.

In addition, the Contractor shall provide to the USGS access to any updates in software and use of photographs or video taken during field deployment for use as scientific training, advertising, or collaboration.

Requirements

The Contractor shall provide an OSL Reader System consisting of the following:

- (1) a Pulsed PSL system in field portable format with 880 nm and 470 nm stimulation wavelengths,
- (2) a selected Senstech 25 mm bialkali photomultiplier system with pulsed PSL photon counting board,
- (3) a re-chargeable battery power supply system,
- (4) USB 2.0 connection to computer,
- (5) portable OSL software and Netbook-PC data logging system,
- (6) a Peli-case suitable for stimulation of samples in 50mm diameter petri dishes.
- (7) If the vendor is also the producer of the software, then software updates as needed shall automatically be sent via email for as long as the software is produced by the vendor.

User Assistance/Training

Preliminary calibration of systems will be performed at the Contractor's facility and the machine will be shipped ready for use. User Assistance and virtual training shall be provided by the Contractor during the 180-day period following delivery of the system.

Assistance shall include technical support for physical device and software via phone or email for at least one year.

Training shall be virtual for a length of time as mutually determined between contractor and USGS Lab personnel. Training shall consist of a checklist of actions to go through upon first machine performance, proof of performance, USG lab calibration, or an abbreviated training manual.

Documentation

The Contractor shall allow USGS use of photographs or video taken during field deployment for use as scientific training, advertising, web-based illustrations, or as collaboration.

Delivery Schedule/Period of Performance

The portable OSL Reader System shall be delivered to USGS within 120 days following the contract award. Training should be completed virtually within 180 days. Standard warranty for mechanical parts and technical support shall last for 1 year. As noted above, if the software is also produced by the Contractor, software upgrades shall continue until vendor has stopped producing the product.

Delivery Location

The system shall be delivered to the following address:
Shannon Mahan, USGS
Bldg 95, National Water Quality Lab (entrance E-3)
9th and Main, Denver Federal Center
Denver, CO 80225