PROGRESS REPORT FOR AINGRA05040

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<th>PROJECT TITLE</th>
<th>Identifying the source of obsidian artefacts from the Russian Far East</th>
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<tr>
<td><strong>INVESTIGATOR(S)</strong></td>
<td>Institution and Department</td>
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<tr>
<td>Chief Investigator</td>
<td>Dr Trudy Doelman</td>
</tr>
<tr>
<td>Other Investigators</td>
<td>Robin Torrence, Australian Museum</td>
</tr>
<tr>
<td>Students</td>
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<tr>
<td>ANSTO Investigators</td>
<td>Dr M. Ionescu, Dr R. Siegele</td>
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**SCIENTIFIC OBJECTIVES**

Stone tools made from obsidian have been transported over vast distances into and around the Primorye Region of the Russia Far East since 18,000 BP. The most important source is the Paektusan Volcano located on the North Korea/Chinese border. Obsidian was also moved from local, inland sources to the coast. The early movement of obsidian is considered one of the first and best examples of overland transport (>700 km) and exchange. This study examines the ways obsidian was acquired and used from 12,000 to 2,000 years ago and how this movement was influenced by changes in subsistence, society, and the migration of new peoples. Previous work (undertaken by Doelman et al. 2004) showed that PIXE-PIGME can effectively discriminate the known obsidian sources in the region.

**PROGRESS REPORT and RESEARCH OUTCOMES**

Previous research has used PIXE-PIGME analysis to identify the chemical composition of rhyolitic and basaltic glass artefacts in the Primorye Region of Far East Russia and to compare these results with samples taken from local and distant geological sources (Doelman et al. 2004). In addition, a geoarchaeological survey assessed the quality and distribution of the available volcanic glass sources in the Primorye region and how these factors influenced past human behaviour (Doelman et al. in press). This approach, in combination with a technological analysis of volcanic glass artefacts from numerous sites in the region, has proved very successful in establishing how volcanic glass was procured, worked and used during the Late Palaeolithic through to the Bronze Age (c. 12,000-2,000BP). Since these initial results demonstrated the importance of obsidian characterisation for understanding archaeology in this region additional fieldwork was conducted in 2005 and 2006 to enlarge the number of geological and archaeological samples. The PIXE-PIGME analysis of these samples includes new geological sources found during the fieldwork and new archaeological sites which have recently been excavated.

ANSTO’s new Tandetron STAR accelerator was used for this analysis. A total of 136 samples, 50 samples from six different geological source regions and 86 archaeological artefacts, were run. Several of the source samples from previous runs were reanalysed to compare previous results from the Van de Graaf accelerator. Most of the geological samples (n=30) were taken from 10 obsidian outcrops in the Basaltic Plateau to establish the amount of variation in the chemical composition of the various outcrops found in this area. The results show that there are two groups of volcanic glass sources. In addition, artefacts from 13 previously excavated sites were run in order to widen the sampling base providing a better representative sample of the variation in the use and distribution of artefacts from the different sources.

A number of interesting results were obtained. A principal components analysis shows that four main groups of sources were used in Primorye (Figure 1). The dominant sources are local basaltic glass and rhyolitic obsidian from Paektusan Volcano, located on the border of North Korea and China. Artefacts from this source have been moved almost 700 km. The results also indicate the presence of a previously recognised chemical group whose location is unknown. Artefacts from this chemical group were originally thought to have come from the Gladkaya River Basin (namely the Vinogradnaya River and the Vinogradnaya Outcrop-2) due to their distinctive green colour. However,
The latest results show that only two of the ‘green’ artefacts could be assigned to this chemical group with the remaining seven are associated with a new chemical group. Furthermore, three artefacts, originally thought to be from Paektusan Volcano appear to be from a rhyolitic source not previously identified in our study. These artefacts are all from Zaisanovka-1, a Late Neolithic site located in southern Primorye. This culture is thought to have had a maritime technology and may even have ties with Japan. It is possible that these artefacts may come from sources in Japan. A detailed comparison of the elemental composition of these artefacts with published sources is required.

The success of this project has lead to other avenues of funding. In particular, we have received a large Wenner-Grenn Grant (International Collaborative Research Grant 2005, $28 000US) to support our continued fieldwork in the area. Two grants from the International Office, University of Sydney (Good Neighbour Grant 2005, 2007, $10,000 and $15,000) to support workshops at the University of Sydney with our Russian colleagues were also obtained. A SESQUI grant ($24 000) from the University of Sydney to study early pottery in the region was granted in 2005. This type of collaborative work has provided Russian archaeologists who have long worked in isolation to play an active and important role in world archaeology, learn new skills and techniques and contribute to pivotal debates on hunter/gatherer archaeology. In return, the project allows Australian researchers to build and strengthen good working relationships with Russian academics, work in an area that no Australian archaeologist have ever worked before and contribute to world scholarship to a greater degree. Expanding our research into the north Pacific places Australian archaeological research into a wider context, creating a deeper understanding of the processes of migration and change that incorporates all of the Pacific Rim, particularly Asia and North America. This collaboration is intellectually, socially and culturally rewarding, providing greater insight into how peoples from very different economic and historical backgrounds can learn, interact and create a successful project.

Although some problems occurred with charging, the results were excellent. They demonstrate a close correlation between the two sets of results from the different PIXE-PIGME lines. 28 artefacts charged to varying degrees. Of these, 12 samples were rejected, 12 were questionable and four were minimally charged. Even with the charging problems, the results indicate that PIXE-PIGME analyses on the STAR accelerator provides significant insights into the changing patterns of human behaviour within Far East Russia. The large number of artefacts dating to the Late Palaeolithic and assigned to the Paektusan chemical group is particularly interesting indicating that people at this time had a larger network of interaction than originally thought. The continued use of PIXE-PIGME analyses is pivotal to our study into the changing use and movement of volcanic glass artefacts in the Primorye region since 12 000 BP.
Publications for Doelman, T.


In press Doelman, Trudy, Robin Torrence, Vladimir Popov, Mihail Ionescu, Nickolay Kluyev, Igor Sleptsov, Irina Pantyukhina, Peter White, Mark Clements. Source Selectivity: An Assessment of Volcanic Glass Sources in the Southern Primorye Region, Far East Russia. Geoarchaeology.

Submitted Doelman, T. Flexibility and Creativity in Microblade Core Manufacture in Southern Primorye, Far East Russia. Asian Perspectives.

Associated Publications (Russian Colleagues)


PhD STUDENTS

None.