Wild science: undertaking geomorphological research on youth expeditions

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Introduction

Every year the British Exploring Society takes large groups of young people (ages 16-25) on expeditions to remote areas of the world. The expeditions focus on adventure, science and media activities and are undertaken in wilderness environments. The nature of these expeditions allows many young people to be introduced to, and take part in, various scientific projects. In 2016 the expeditions were based in the Amazon (Manú, Peru) and the Himalayas (Ladakh, India) and included geomorphological projects.

2016 Expedition Geomorphological Projects

Peruvian Amazon

The Manú Biosphere Reserve [Figure 1] is an UNESCO World Heritage site and one of the largest protected areas in Peru. Until 30 years ago the area had undergone high levels of deforestation through mining and converting pristine primary rainforest to farm land; this land has since been regrown as secondary forest. In order to understand this impact the project explored the link between vegetation density and soil structure along an anthropogenic gradient extending from a human inhabited area through to primary rainforest. A vegetation density index was produced by counting the number of trees within a square metre [Figure 2]. Levels of nitrate and phosphate within the soils were also studied.

Indian Himalaya

The expedition was based in the Suru Valley, Ladakh, specifically around Pensi La [Figure 3]. The project focussed on recent environmental change and the sustainability of local water resources in a changing climate, with geomorphological mapping a key component of the project. There were two stages to this project: 1) pre-expedition geomorphological mapping using Google Earth imagery [Figure 4]; 2) geomorphological mapping during the expedition in order to ground truth the remote sensing data. The second stage (field mapping) had limited success due to a mid-expedition change in location as a result of circumstances beyond our control.

Figure 1: View of part of the Manú Biosphere Reserve.

Figure 2: Undertaking fieldwork in the Manú Biosphere Reserve.

Figure 3: View of the Pensi La study area.

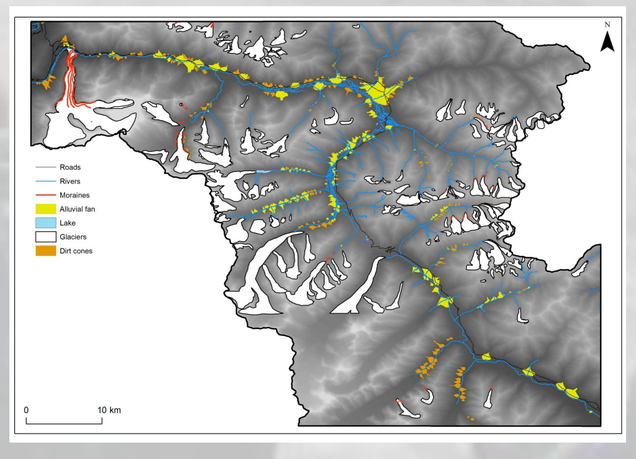


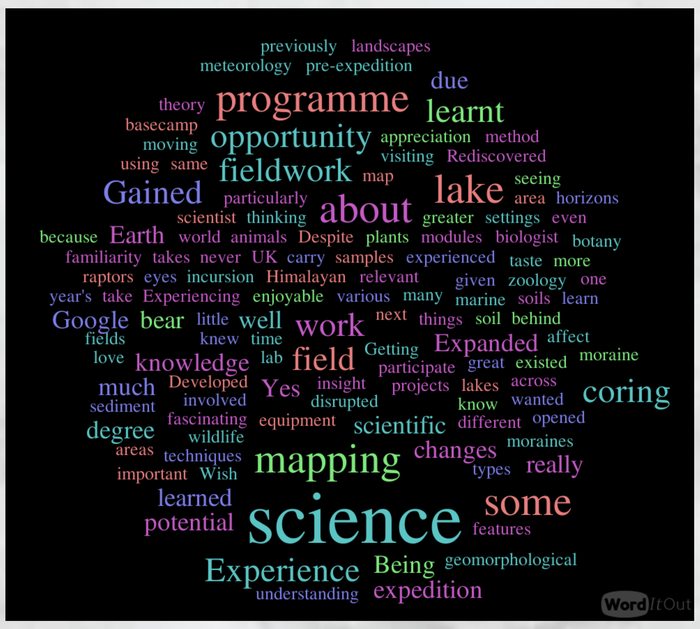
Figure 4: Geomorphological map produced pre-expedition from Google Earth imagery.

The value of the expedition science projects as geomorphological outreach?

The young people participating in the expeditions were asked two questions: 1) What is geomorphology? and 2) Why is geomorphological research important? These questions were asked both at the beginning and at the end of the expeditions in order to see whether participation in the expedition science projects led to an enhanced understanding of geomorphological research. The answers given were analysed and the 10 most frequent words used are listed in Table 1. The words used are similar but some of the answers to question 2 at the end of the expedition are more focussed and applied, and the words used are directly linked to the expedition research projects.

Table 1: The 10 most frequently used words in the answers to the two questions asked of the expedition participants. Words are listed in frequency order.

Question	Beginning of expedition	End of expedition
1) What is geomorphology?	study; rocks; change; shape; changing; land; Earth; landscapes; landscape; time	landscape; study; changing; natural; landscapes; processes; shape; changes; through; geographical
2) Why is geomorphological research important?	understand; future; past; Earth; predict; changes; change; research; understanding; geological	future; past; changes; understand; resources; processes; change; use; climate; water



A third question (Have there been any benefits for you as a result of participating in the expedition science programme?) was asked at the end of the expedition. Figure 5 presents the words used to answer this question. Answers were overwhelmingly positive, with many young people acknowledging that they had learned about new areas of science and appreciating the opportunity to learn about and undertake scientific fieldwork in such remote locations. One young person stated that as a result of the expedition science programme 'I have learned that there are many fields of science that I never knew existed but are important and affect me' while another said 'it has opened my eyes to the world of scientific fieldwork'. Others realised that carrying out scientific fieldwork allowed them to 'expand my knowledge and appreciation of the area I am visiting.' Many of the participants expressed a wish to have been able to take part in more scientific activities with one observing 'Wish there had been opportunity for more. '

Figure 5: Word cloud of the words used to answer the question 'Have there been any benefits for you as a result of participating in the expedition science programme?' Word size is relative to frequency of word use.

Conclusions

Incorporating scientific research projects into expedition programmes enabled groups of young people to be exposed to a number of fields of science and scientific techniques. The participants enjoyed the scientific fieldwork and considered the science projects to be a useful component of the expeditions. The scientific activities led to a better understanding of the expedition environments and allowed participants to consider how these remote environments are being impacted by human activity and environmental change.

Acknowledgements

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