

GRANDE

News Letter

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A BIG CHALLENGE OF “GRANDE” PROJECT

Prof. Javier Mendoza

Instituto de Hidráulica e Hidrología, Universidad Mayor de San Andrés, Bolivia

My October 2012 visit to Tohoku University in Sendai, Japan, was a very special experience, first, because Japan is a unique country and very different from my homeland and, second, because it allowed me to experience the academic environment of Tohoku University . These experiences, and working with Japanese academics, reinforced my desire to learn from and contribute to the GRANDE Project . My participation in this project will improve my understanding of hydrologic modeling of glacier basins. It will also allow me to contribute my knowledge and experience of hydrological, meteorological and glaciological monitoring, which has been the principal motivation for my participation as a team leader in this project. I believe that this project provides an environment where individuals can learn and use their specialist expertise to teach others, and can also see the results of their own research and that of others.



I am convinced that the Japanese and Bolivian participants in the GRANDE Project will learn many lessons. It is the beginning of a long journey of scientific investigation that will deepen our knowledge of the science of water, with the important goal of improving the lives of many.

The challenge for the Institute of Hydraulics and Hydrology is to continue to make a meaningful contribution to the GRANDE project. I understand that what we are doing now is just the start of a long process that will improve our knowledge of the hydrology of the study area . We have installed measurement systems, and we have acquired new knowledge and human expertise from Japanese universities.

The challenge has been set and, of course, I want to have a leading role in meeting that challenge.



SATREPS For the Earth, For the Next Generation



Activity Report

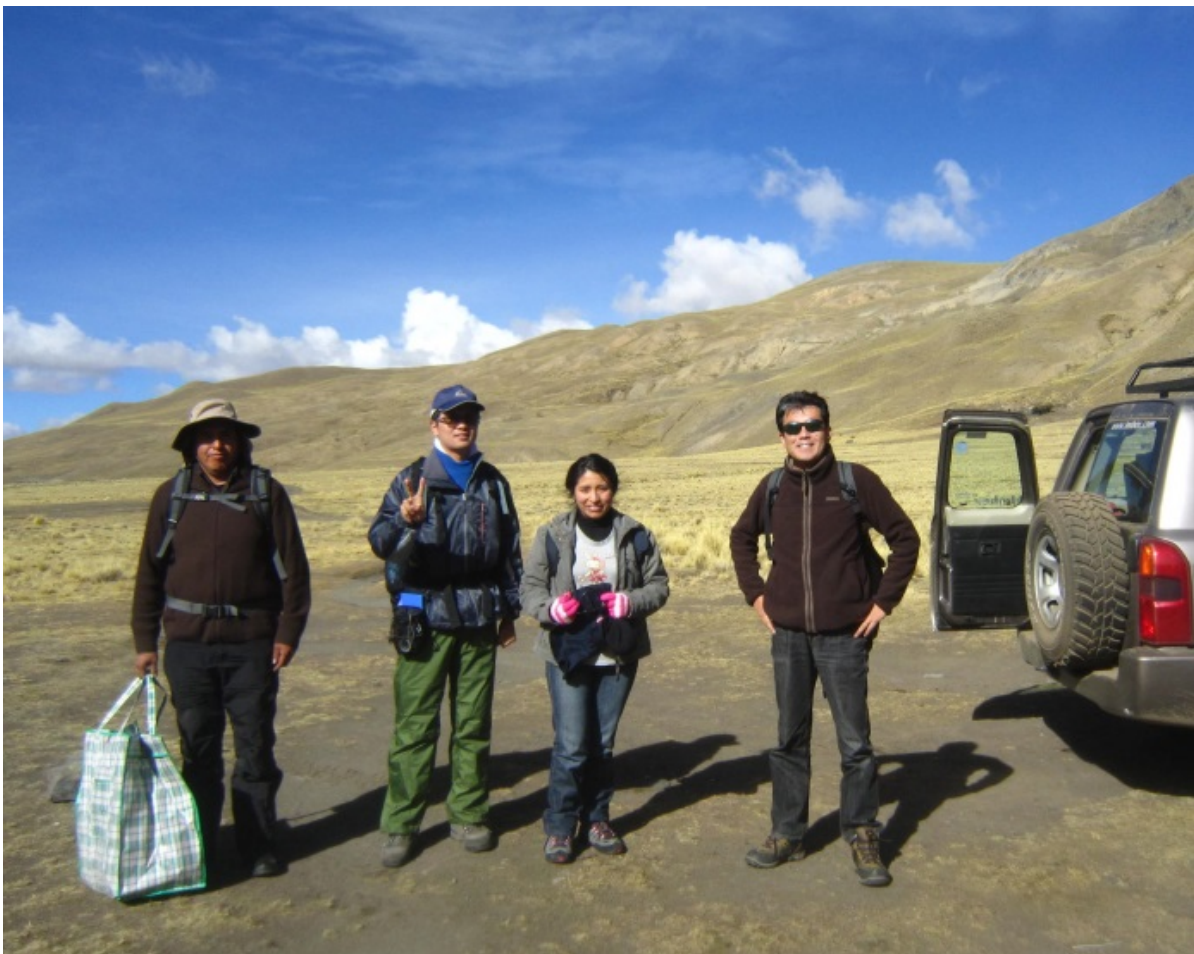
Water Environment Investigation and Water Treatment Seminar, Dr. Nakano, Nihon University



From August 7 to 15 I worked in Bolivia with Dr. Umeda and Evelin, a Bolivian student at Tohoku University. Our main objective was to collect water samples from the major streams of the Condoriri and Huayna Potosi basins and the Tuni Lake basin during the austral winter dry season. As the areas we worked in include huge natural wetlands, water quality is affected by the seasonal life cycles of the wetland ecosystems. Generally, in aquatic ecosystems there are considerable seasonal variations of environmental conditions such as water temperature, solar irradiation, water level, and runoff water, all of which can contribute to nutrient contamination. Hence, field observations are essential to gain an understanding of changes of water quality in water basins such as those in Bolivia. As I had expected, during this visit the water levels in the streams

and Tuni Lake were lower than during my previous visit in September 2012—some of the lakes had dried up. A consequence of low water levels is the death of algae and submerged aquatic plants; this can cause temporal nutrients load to water basins. Our measurements of water quality will clarify the influence of seasonal changes of water levels on wetland ecosystems.

While in Bolivia, I also had an opportunity to give a lecture at the Bolivian Instituto de Ingeniería Sanitaria y Ambiental (IIS) in which I presented an introduction to water purification technology using the natural

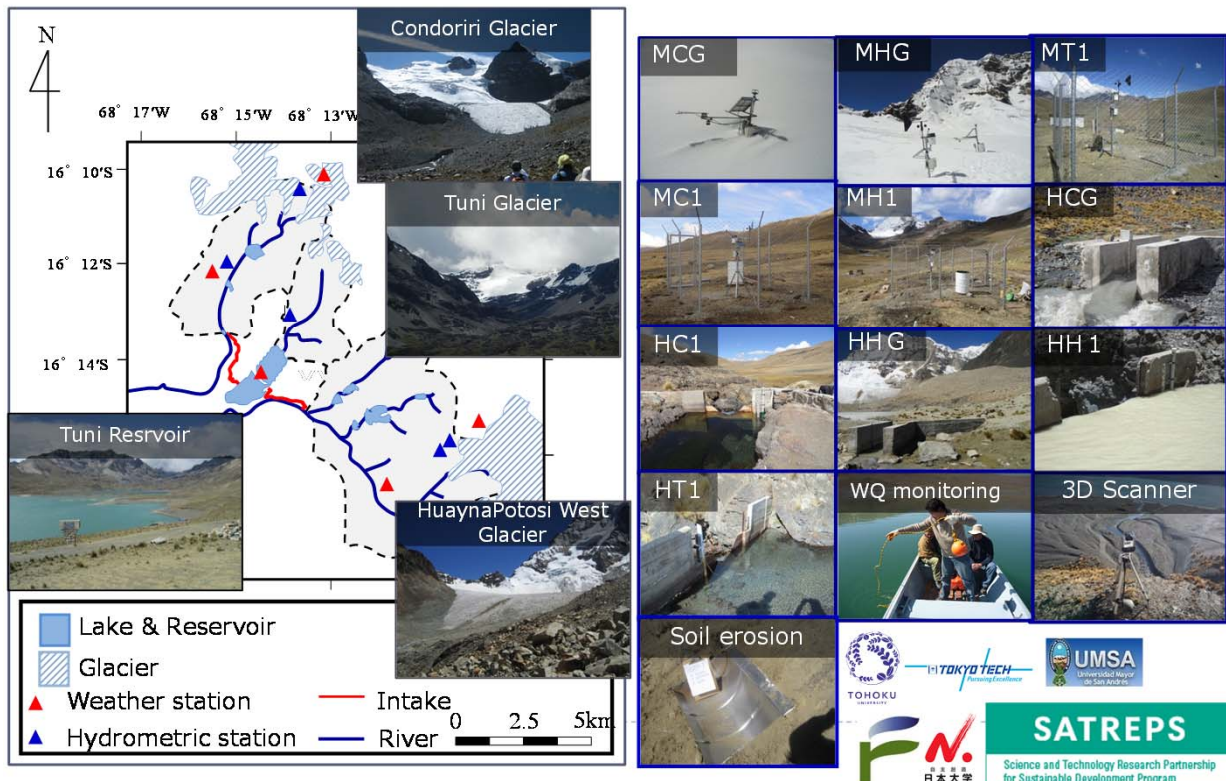


functions of wetland ecosystems. Wetland ecosystems have a variety of functions, of which water purification is just one. Although the water purification capacity of natural systems is limited, it can be improved with engineered support. Engineered ecosystems, such as constructed artificial wetlands, can provide adaptive systems for water quality control, especially in developing countries such as Bolivia. The abundance of available land and natural ecosystems in Bolivia provides huge potential for the practical use of engineered ecosystems. I hope that my lecture has prompted Bolivian researchers to keep this technology in mind as a practical method for water quality control in their country.



Glacial, hydrological and meteorological monitoring network of the GRANDE Project

Tuni Reservoir Catchment



The GRANDE project has established a glaciological, hydrological, and meteorological monitoring network that has been operational since May 2011. The network is in the catchment of the Tuni reservoir, which occupies an area of about 45 km² about 40 km from La Paz city. The Tuni reservoir (4370 m above mean sea level) is an important source of drinking water for the cities of La Paz and El Alto. The catchment has several types of land cover, including the Condoriri, Tuni, and Huayna Potosi West glaciers in the upper reaches of the catchment, and glacial lakes and lagoons.

Five automatic weather stations and five water-level gauges have been installed in the catchment, and a water-temperature gauge has been installed in Tuni reservoir. We have made periodic measurements of glacier topography by using a 3D scanner and have taken water samples for analysis of water quality. Some of the monitoring has been aborted because of some troubles, but most of our monitoring equipment is operational at present. Data acquisition, mainly by Bolivian researchers, will make a valuable contribution to the evaluation of climatic conditions throughout the catchment and will improve our understanding of glaciology, hydrology, and hydraulics within the catchment.

Our monitoring network is unique in the Andes because we observe many kinds of parameters associated with glaciology, meteorology and hydrology. We can understand unique phenomena in the Tropical, high mountainous and glaciated catchment from monitoring data. These data and scientific insight will allow us to develop glacier melt, runoff, sediment and water quality model for Andean environment.

GRANDE Students

Keisuke TANI, Master course student, Tohoku University

I'm a second-year Master's degree student at Tohoku University, where I am studying under the supervision of Dr. Umeda. Since I was an undergraduate student I have been involved in assessing the effect of global warming on the aquatic environment of Tuni reservoir. My main motivation for getting involved in the GRANDE project stems from a strong interest in the unique environmental issues confronted by Bolivia. As a B3 student, I heard about the GRANDE project in class and was surprised to find out that there are cities in the world that depend on glaciers as their major sources of water. I became very interested in the problem of water shortages in a distant country where the lifestyle and environment are so different to mine. I considered this to be an interesting and very worthwhile area of research.

I have been fortunate to have three opportunities to travel to Bolivia—more visits than other Japanese students involved in the GRANDE project. As well as taking part in fieldwork, I have been able to attend meetings between the Japanese and Bolivian project teams.

In October 2013, Dr. Umeda opened the model seminar and introduced the water quality model we use for counterparts at IIS building in Bolivia. For me, the most important outcome of the seminar was gaining an





understanding the seriousness of the problem of water resources in Bolivian cities and the importance of the role of the Japanese team in assessing the magnitude of the problem. I also realized that Japan has a very important role in providing technology to help developing countries. This led me to understand why my studies are important for people in Bolivia and gave me the motivation to study hard so I can write a good graduation thesis.

The work in Bolivia is physically hard for everyone from Japan. The first two or three days in Bolivia are the most difficult as our bodies adapt to high altitude. Unfortunately, I have suffered from altitude sickness each time I have visited La Paz. However, I was able to complete my fieldwork safely thanks to the support and guidance of Dr. Umeda, Ms. Okamura, and the JICA staff. I greatly appreciate the support of all of these people. Trekking in the mountains to collect samples at altitudes of more than 4000 m is very hard. However, wherever we trek the scenery changes and we see the vast natural expanse of the Andes. We see many animals, plants, and natural phenomena that are unique to the Andean environment. These new experiences outweigh the hardships for Japanese researchers and make our field work in the Andes enjoyable.

After I graduate, I plan to join a civil engineering consultant and work in the water-resources sector. I expect I will first work mainly in Japan and perhaps later in developing countries. If I do work abroad, I will remember my studies in Bolivia and hope to make a contribution to the wellbeing of people in developing countries.

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Department of Civil Engineering, Graduate School of Engineering, Tohoku University
6-6-06 Aoba Aramaki, Sendai JAPAN 980-8579
http://grande.civil.tohoku.ac.jp/index_e.html
newsletter@grande.civil.tohoku.ac.jp



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