INDO SWISS JOINT RESEARCH PROGRAMME (ISJRP)

RESEARCH FELLOWSHIPS

EXCHANGE GRANT REPORT

Grant No.: RF31

Part 1 - General Information

<table>
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<tr>
<th>Project Title:</th>
<th>Reconstruction of Late Holocene Terrigenous flux to the mudflats of Gulf of Kachchh coast, western India: Implications for paleoclimatic and sea level fluctuations</th>
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<tr>
<td>Keywords:</td>
<td>Late Holocene, Paleoclimate, Sea level changes, Terrigenous flux</td>
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<td>Start date:</td>
<td>3rd October 2011</td>
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<td>Duration:</td>
<td>9 months</td>
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Part 2 - Exchange Participant(s) Details

VISITING SCIENTIST

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Part 3 - Scientific & Technical Information

3.1 Purpose of visit

The objective of the project was to study the mudflats of Gulf of Kachchh coast as an archive to elucidate the records of past climatic and sea level variations in the region during Late Holocene. For this we had retrieved a core of 2 m length from coast of Gulf of Kachchh and sampled it at 1cm intervals. The main objective for visiting Geological Institute, ETH Zurich, was to analyze these samples for modern proxies like sediment geochemistry, environmental magnetism, clay mineralogy, heavy minerals and radiocarbon dating, which are robust, fast and efficient techniques in present times for paleoclimatic and/or sea level studies around the world. The necessary laboratory devices are not available at my home Institute in India.

3.2 Short description of work carried out during the visit

During the 9 months stay at ETH Zurich, I have analyzed around 200 samples for various environmental magnetism parameters including the magnetic mineral concentration, granulometry and mineralogy. Approximately 45 samples were analyzed for clay minerals, followed by an equal number of samples for heavy minerals of the sand fraction. Total 100 samples were analyzed using X-ray fluorescence for quantifying the sediment geochemistry, and in an equal numbers of samples total organic carbon and total inorganic carbon were measured.

3.3 Outcomes

One of the major outcomes was my personal training in the above mentioned techniques, which will be very much useful for my future scientific career.

The main results of the study obtained during the visit are as follow:

1) A high resolution Middle to Late Holocene record of terrigenous flux to the Gulf of Kachchh coast has been reconstructed.
2) The study reports a Paleo-tsunami sand layer dating back to 1.3 ka BP.
3) The signature of high sea level in western India upto 2.5 ka has been recognized in the sequence (additional dating to reveal the start of this event is in progress).

3.4 Future collaboration with host institution

We intend to take up more collaborative projects and work on other aspects of allied interest form other parts of Gujarat, India.

3.5 Various comments

3.6 Projected publications/articles resulting or to result from the exchange

Abstracts in form of oral and poster presentations arising out of project:
1. “High resolution Mid to Late Holocene paleoclimatic reconstruction from the mudflats of the Gulf of Kachchh, western India” to be presented at EGU General Assembly meeting, at Vienna, Austria during 22-27th April 2012.


Full length publications arising from the project:

“Paleoenvironment and Sedimentation during Middle to Late Holocene in the Gulf of Kachchh, western coast of India : Implications on sea level changes and high energy events.” In preparation

We are going to write up two more full length publications dealing with the environmental magnetism application and provenance study during the coming months.