VANCOUVER ISLAND UNIVERSITY

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THE THRUST

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SUMMER IS ALMOST OVER! BY TIM STOKES AND STEVE EARLE—THE EDITORS!

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Earth Science Department

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Summer is over and the fall term is upon us! There are lots of activities in this issue of the Thrust as it is over a year since the last one in April 2009! Some of the department highlights to report since then:

- GEOL 390 field trip to San Franciso (Feb 2010)
- GEOL 112 fossil field trip to Hornby Island (March 2010)
- GEOL 206 field school on Quadra (May 2010)

Geology courses planned for Fall 2010 include:

GEOL 111 & GEOL 111A – Discovering Planet Earth
GEOL 200 – Mineralogy
GEOL 301 – Cave & Karst Landscapes and Systems (Online**)**
GEOL 412 – Climate Change: Past, Present and Future

Geology courses for Spring 2011 include:

GEOL 112 & GEOL 112A – Understanding Earth's History
GEOL 201 – Sedimentology and Stratigraphy
GEOL 202 – Earth Structures
GEOL 470 – Earth Science Issues in British Columbia (A Special Focus on Earthquakes)
GEOL 304 - Hydrogeology
SCIE 303 – Energy and the Environment (Online)

Two students graduated with a Minor in Earth Science in June, 2010. They were Rebecca Stirling and Cat Imray. Both have been working all summer in mineral exploration jobs and are probably still out in the field. Congratulations to you both.

Two students are required for co-op positions as lab assistants for the department. Their main work will be helping with setting up first year labs. Contact owen.peer@viu.ca if you are interested.

The Earth Science Club is functioning and any students wishing to get involved should contact Michelle at mickringill@hotmail.com or Ginny countercanter@gmail.com This is a great chance to go on geo-hikes and explore the island.

As ever we are still awaiting final construction of the fossil hut. The latest is that the metal work for the braces is completed and that the wood taken from VIU woodlot is being milled. A fall start on construction has been indicated by Trades. Let's hope 2010 is the year!

Have a great fall!

Tim Stokes/Steve Earle

If you wish to include any Geo-related news in next edition drop an e-mail to tim.stokes@viu.ca

GEOL 390 FIELD TRIP TO THE SAN ANDREAS FAULT BY STEVE EARLE

In February of this year a group of ten VIU students and three Earth Science faculty travelled to San Francisco to study the San Andreas Fault and some of the cool rocks of west-central California. We saw lots of evidence of damage related to both major earthquakes and ongoing fault creep, and we got to look at amazing scenery and rocks. We also observed earthquake damage and talked about seismic upgrades at two of the country's best known universities: Stanford, which is south of San Francisco, and U. C. Berkeley, which is across the bay from San Francisco.

The Parkfield Bridge spans a creek along the trace of the San Andreas Fault a few hundred km south of San Francisco. It is especially designed to withstand movement along this active part of the fault. These brave and dedicated VIU students are doing their best to put a stop to any further motion between the Pacific Plate and the North American Plate at this boundary.

This is a "knocker" (an erosional remnant) of Franciscan Complex eclogite north of San Francisco. This rock contains bright red pyrope garnets, sodium-rich pyroxene and beautiful blue glaucophane (sodium-rich amphibole). The parent rock is sea-floor basalt that has been subducted and metamorphosed at very high pressures (depths in the order of 45 km), and has then been returned to the surface by faulting.

A TRIP TO THE NISGA'A LAVA FIELD IN NORTHERN BRITISH COLUMBIA BY STEVE EARLE.

In May I was lucky enough to get to the Nisga'a lava field and Tseax River Cone (a.k.a. Aiyansh Volcano) north of Terrace. The last eruption in this area occurred approximately 250 years ago, and that makes it Canada's most recent volcanic eruption. The eruption formed a cinder cone about 100 m high, and then the lava flowed down the Tseax River, and into the broad valley of the Nass River near to the village of Aiyansh. The lava flow covers an area of about 250 square km. According to Nisga'a history about 2000 people died in the eruption, making it the 15th deadliest volcanic eruption of all time. Volcanism in this region is related to rifting of the North America plate.

The magma that erupted 250 years ago was mafic in composition, and as you can see in the photo to the left, both pahoehoe (the flat rock in the foreground) and aa (the jagged rock in the background) formed during the last eruption.

At one location the lava flowed around a tree trunk about half a metre in diameter. The wood has been burnt and/or rotted away, but you can still see the impression of the bark in the lava (centre of the photo to right).

A SUMMER JOB LEARNING ABOUT MINERAL EXPLORATION BY MICHELLE ICKRINGILL

I had a great summer hiking and working at various mineral exploration sites on Vancouver Island. I worked at various " exploration camps", staying in motels or rented apartments near Port Alice, Port Alberni and Lake Cowichan. I did a wide variety of field work such as soil sampling on grids, line mapping, traversing creeks to get moss mat samples, and a whole lot of general prospecting. I saw some really awesome mineral deposits which may some day be developed into mines that could benefit the economy of local communities. It was such a great experience and I learned so much. Mineral exploration is definitely an exciting branch of earth science.

Here I am near an old mine shaft that I mapped.

This is a site where we gathered some great ore specimens

A helicopter doing an airborne electro-magnetic survey

A VISIT TO SLOVENIA: AN INSIGHT TO LIVING ON A KARST LANSCAPE

BY TIM STOKES

During June of this year I had the opportunity to attend a cave and karst conference in Slovenia at the Karst Research Institute of Postjonia. Slovenia is a relatively small country of 2 million people and is roughly the size of Vancouver Island and is part of what was once Yugoslavia. The focus of the conference was on the Classical Karst of the Dinaric Alps, and in particular the 'Kras Region' from where the term 'karst' was derived. (For those unfamiliar with the karst, it is a form of landscape that occurs primarily by the dissolution of limestone bedrock, resulting in underground conduits and caves, subsurface streams and in some cases specialized ecosystems and fauna.

Having not been to Europe for over ten years it was going to be an adventure. My travels started with a cheap flight to Frankfurt and then travelling to Slovenia by train via France and Italy, with a short stop in Lyon to visit my daughter. Trying to get into Slovenia from Italy was interesting as somehow train and bus connections did not really work - a hang up from post-war relationships I was told. I was also going to be in Slovenia for the soccer world cup in which Slovenia was one the teams that had made it to the final thirty-two. My home for the week was a cabin in a campground that was located in a large field of karst sinkholes!

The town of Bled Castle on top of limestone bluffs

A 'polje' used for farmland, with residual karst hills and forest in the background

MORE ON SLOVENIAN KARST

The conference was a week long and included 2 days of presentations and posters (including one that I submitted on karst research activities at VIU) interspersed with five field trips. Some of the highlights of the field trips are as follows:

- An evening underground trek through Postojna Cave – which is now a major tourist cave (with a train!), but was used through the centuries as a refuge for people during times of war and a storage site from munitions and fuel
- A visit to a world heritage cave at Skocjanske Jame, which was breathtaking with an amazing walkway along the edge of an underwater canyon in full flow.
- Exploring karst on the surface including areas of forested sinkholes (they call karst sinkholes 'dolines'), a number of poljes (large broad and flat karst plains that are periodically flooded) used for farm land, and some large karst springs (used for drinking water, generating electric power, and powering sawmills).
- A final day trip to the Speleobiological Museum near Postjonia and to see live 'human fish' better known as *proteus anguinus* (a blind salamander that is adapted to living underground) with a bonus visit to Predjamskim Cave located behind a 15th century castle.

Hiking in the World Heritage cave at Skocjanske Jame, which a subterranean river and canyon with an amazing 3 km trail . From the colour of the water it is clear we have just had some heavy rain the day before!

It was also a great opportunity to talk with researchers and students from all over the world – Cuba, Croatia, France, Germany, US and New Zealand. One of the key things that I learnt was that life is very different when you live on a karst landscape. It is important to know how it works as you are relying on it for your water, your forests (everyone seems to have a woodlot), your food (lots of farms and agriculture) and tourism—cave visits are very popular and big business.

I would certainly recommend Slovenia as a place to travel as everyone is friendly and most speak some English. Food, accommodation and travel is relatively expensive - 2 Euro for a big bottle of Lasko beer! There is also lots to see especially if you like karst, mountains, farmland and forests!

Photo above. Students (one from the US and one from Croatia) getting ready to some serious caving at Predjamskim Cave and castle. Photo below. Checking out a sawmill powered by a karst spring

Photo below - A major spring outflow used to generate a small hydro-electric plant

Photo below - Solutional limestone outcrops in the typical forests of Slovenia

A QUADRA ISLAND ODYSSEY—GEOL 206 FIELD METHODS BY SANDRA JOHNSTONE

At the end of April a group of intrepid Earth Science students ventured out into the wilds of Quadra Island to gain practical skills in geologic mapping and field methods. An important boundary between two distinct geologic terranes is exposed on Quadra Island and participants got the opportunity to observe and map this boundary in detail. A second mapping project was carried out on central Quadra Island to supplement Tim Stokes' karst research by providing a bedrock geology map that might provide insight into groundwater flow patterns.

Photos: Top left—Rebecca, Sarah and Ginny take a break on the bluffs at Comox; Middle left – map work; Bottom left—tour of Quinsam Coal; Below— Michelle and Amber record data in central Quadra Island.

GEOL 112 FOSSIL COLLECTION TRIP TO HORNBY ISLAND BY SANDRA JOHNSTONE

Treharne Drury displays his Bacculites occidentalis

Graham inspects a shark's tooth collected by Jesse Alexander

The annual GEOL 112 fossil hunting trip to Collishaw Point on the northwest coast of Hornby Island was a great success! Many interesting and beautiful fossil specimens were collected from the Upper Cretaceous aged shale of the Northumberland Formation of the Nanaimo Group. Many fossils were discovered in rounded rock formation resistant to weathering, known as concretions. Some of the specimens collected include many varieties of ammonites including the common heteromorph ammonite *Bacculites occidentalis*, several species of bivalves, shark's teeth and possibly even a bird or pterosaur bone, which would be a spectacular find!

Graham Beard examines a possible bird bone discovered by Kim Acton and Niki Black

Index fossil for the Upper Cretaceous, bivalve Inoceramus Vancouverensis