

Earth and Space Sciences Class of 2016

Compiled by:
Nicholas Thibault
GeoClub President





Hannah Allen



Brandon Bentcover



Shiori Baba



Kevin Darole





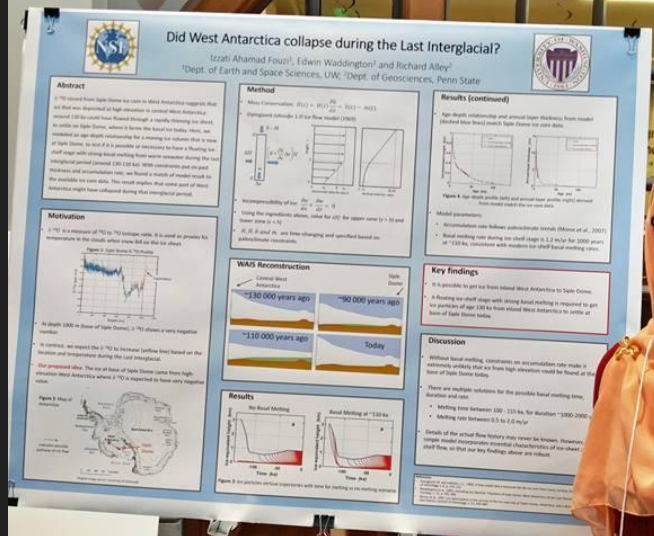
Nhat Dinh







Izzati Ahamad Fouzi




Izzati Ahamad Fouzi
 Student Researcher





Guy Giesa-Wilson



A young woman with blonde hair tied up, wearing a grey jacket and a blue backpack, is smiling and leaning on a wooden railing. She is standing on a wooden overlook with a metal railing, overlooking a vast, rugged mountain valley. The landscape is characterized by steep, eroded hillsides with visible gullies and sparse vegetation. In the distance, a small town or village is visible in the valley. The sky is bright blue with scattered white clouds. The overall scene is a scenic mountain overlook.

Madeleine Hummer





Ian Lee



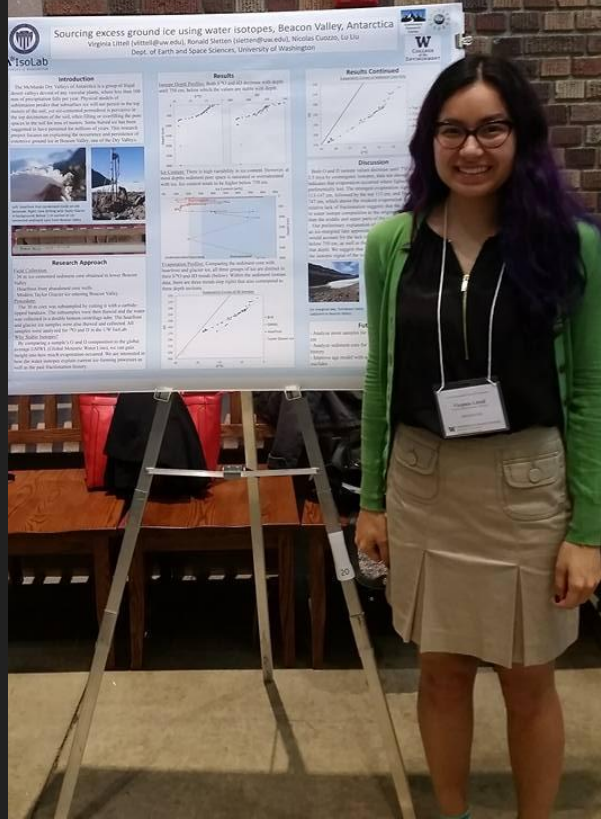


Zi Xian Leong





Virginia Littell

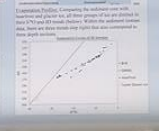
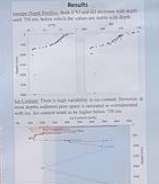


Sourcing excess ground ice using water isotopes, Beacon Valley, Antarctica
Virginia Linnell (vlinnell@uw.edu), Ronald Dettinger (rdettinger@uw.edu), Nicolas Cagnoni, Li Liu
Dept. of Earth and Space Sciences, University of Washington

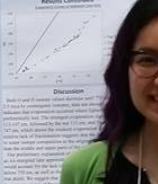


Introduction
The McMurdo Dry Valleys of Antarctica is a group of eight river valleys devoid of any surface water, where the low level of precipitation (500 mm per year) is offset by evaporation and sublimation. The water table is a few meters below the surface, and the water table is a few meters below the surface. The water table is a few meters below the surface. The water table is a few meters below the surface.

Research Approach
1. We use ground water samples collected in the Beacon Valley area.
2. We use ground water samples collected in the Beacon Valley area.
3. We use ground water samples collected in the Beacon Valley area.



Discussion
Based on the results, we conclude that the ground water in the Beacon Valley area is sourced from the atmosphere. The water table is a few meters below the surface. The water table is a few meters below the surface.



Conclusions
The results of this study show that the ground water in the Beacon Valley area is sourced from the atmosphere. The water table is a few meters below the surface. The water table is a few meters below the surface.





Eddy Liu







Linnea McCann





Brittany McManus





Testing the Relationship between River Drainage Patterns and Active Faulting in New Zealand using a Geographic Information System (GIS)

Department of Earth & Space Sciences • University of Washington, Seattle

Undergraduate: Katherine Midkiff, Geology Major • Mentor: Alison Duval



INTRODUCTION

RESEARCH QUESTION

- For this investigation, I developed a repeatable Geographic Information System (GIS) model using Esri's ArcMap software to test if and under what circumstances rivers preferentially erode along surface fault traces.

MOTIVATION

- Geoscientists have long assumed that strain along faults weakens rock and leads to focused erosion. Such positive feedbacks between faulting and surface processes have yet to be investigated at the scale of major fault systems.

STUDY AREA

- River networks in New Zealand, an active obliquely convergent tectonic setting with hundreds of surface breaking faults are examined. River reaches that travel parallel and along the faults will be identified.

METHODOLOGY

DATA

- Two digital datasets were used:
 - Active fault data from GNS Science (New Zealand's geological survey) (Langridge et al., 2014).
 - River data from LINZ Data Service (New Zealand's national land mapping agency) (LINZ/National Topographic Office, 2016).
- Both datasets were Shapefiles (Line Features) and in units of Meter

MODEL

- The model consists of both **automated** and **manual** steps, the goal is to make the model as automated as possible. Future work on the model will have this goal in mind.

METHODOLOGY CONT.

AUTOMATED

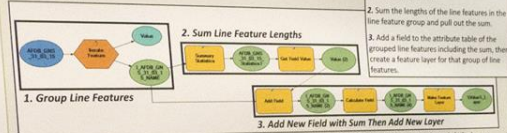


Figure 1 The automated portion of the GIS model uses the Modelbuilder feature in ArcMap to complete steps 1 through 3. Each new layer is opened and the Sum field is observed for a particular fault length; current parameter is 30 km. Referenced ArcGIS Pro, n.d.

MANUAL

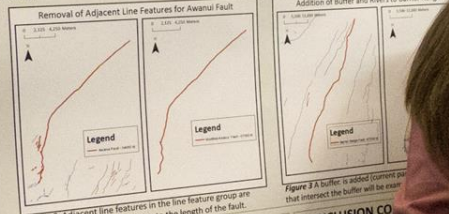


Figure 2 Adjacent line features in the line feature group are removed due to not contributing to the length of the fault.

Figure 3 A buffer is added (containing rivers) that intersect the buffer will be excluded.

CONCLUSION

- The GIS model is meant to be transportable to other large fault systems such as the San Andreas Fault Zone in California, with the ultimate goal of extracting tectonic information directly from the earth's surface.

NEXT STEPS...

- Further analysis of rivers and faults to calculate metrics such as the percentage of the fault with river running along it, lengths of river segments that flow along faults, and other variables such as fault type, slip rate, and fault strike.

CONCLUSION CO

- Continue to work towards the model to save time & error.

REVISIONS

- Revised the model to be more user-friendly.

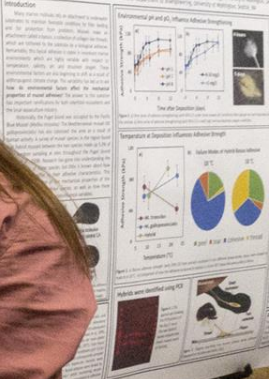


Katherine Midkiff
PRESENTER
UNIVERSITY OF WASHINGTON



Environmental Conditions Influence the Formation and Function of Microbial Biosynthetic

Matthew W. George, Benjamin D. Hodge, Nicholas D. Lawrence, and Jeffrey C. Gerber
*Key-note conference, Friday October 10, Department of Biology, University of Washington, Seattle, WA



Katherine Midkiff





Nikolas Midttun



Angela Christine Oberti



Page
CITY LIMITS





Mara Page







Samantha Potter





Austin Rains



Erica Sampaga



Linking Surficial Geomorphology with Vertical Structure in High and Low Energy Marine Environments

Erica Sampaga, University of Washington



Figure 1. Location map illustrating the two study sites used, with the Bayview site to the Strait of Juan de Fuca and the South Puget Sound located to the other the Puget Sound, Washington, USA.

Introduction

The inland waters of the Puget Sound, Washington, USA, and Georgia Bays, British Columbia, Canada, is a complex system of high energy river inputs to lower energy bays linked with direct connections to the open ocean through the Straits of Juan de Fuca. High energy systems relying on transport mechanisms for coarse sediment interact with low energy regions with transport deposition of finer sediments to create the vertical morphology of the seafloor. In regions of high energy the seafloor expression is dominated by a rugged seafloor with more geomorphic features of coarse material, while low energy regions are expressed in a seafloor of uniform composition. This research investigates the link between the surface expression of seafloor roughness and the underlying vertical structure of sediment deposition. Using high resolution bathymetric surface derived from multibeam sonar combined with low frequency sub-bottom acoustic profiles, the depth of acoustic penetration is correlated with a local calculation of seafloor roughness. Areas of lower acoustic impedance have a larger range in penetration, with lower ranges of penetration persisting in areas of high acoustic impedance. High acoustic impedance is indicative of harder sediments, such as sand, and low acoustic impedance indicates softer sediments, such as mud. The research is a comparative study between a high energy system adjacent to the mouth of the Duwamish River and the low energy protected region of South Puget Sound. The research illustrates the strong link between seafloor geomorphology and the horizontal source of sediment input and migration of sediment transport energy.

Methods

Three parallel transect lines of approximately 800m length were surveyed on November 11, 2015 aboard the R/V Thomas C. Thompson using multibeam bathymetric sonar (EDINA3D, Kongsberg 350 and Kongsberg 3200 "strip" sub-bottom profiler) at the two study locations representing the high energy Duwamish River and low energy South Puget Sound. Data from the multibeam sonar was post-processed in CARIS Hypack and Sips 3.0 to create bathymetric surfaces of the surveyed area and to identify surficial expressions of geomorphic features corresponding to high or low energy systems. The post-processing software, SonarView 2.1, was used on the strip data to clip and remove survey turn data. These lines were then imported on SonarView in ArcGIS, along with bathymetric surfaces created in CARIS. In ArcGIS, several functions were run in order to create elevation profiles along the surveyed lines and to determine seafloor roughness.

Koufonos Post Surveys were used to view shell differentials between and within stratigraphic layers, determine the range of penetration, and the type of seafloor based on impedance. At some of the sites, we offset the strip data was run through Matlab script to realize these efforts with one outlier.

Conclusion

The survey lines of the high energy environment of the Duwamish River show exhibit similar ranges of rigidity, sediment composition, and sediment stratigraphic layers, determine the range of penetration, and the type of seafloor based on impedance. At some of the sites, we offset the strip data was run through Matlab script to realize these efforts with one outlier.

Acknowledgements

This research is part of the E-FLAME project, funded by the University of Washington. I thank the staff of the University of Washington, particularly the staff of the Center for Environmental and Estuarine Science (CEE), and the staff of the Center for Environmental and Estuarine Science (CEE).

High Energy Environment



Figure 2. Duwamish River study site with the transect lines used for surveys.



Figure 4. Elevation profile, in meters, of Line 7 from the Duwamish River study site, created in Matlab to realize depth offsets within the strip data. The offset value for 40 profiles is a portion of the strip line change in elevation that serves to better display the vertical structure.

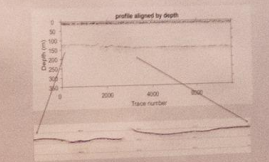


Figure 6. Elevation profile, in meters, of Line 7 at the Duwamish River study site, created in Matlab to realize depth offsets within the strip data. The offset value for 40 profiles is a portion of the strip line change in elevation that serves to better display the vertical structure.

Line	Min	Mean	Max	Std Dev	Range
2	-4.33	7.95	-0.02	0.83	12.28
3	-5.03	4.26	0.02	0.38	9.26
7	-4.27	3.84	0.01	0.49	8.21

Table 1. Statistics for seafloor roughness along survey lines for the Duwamish River. All values are in meters.

Line	0-5m	1-10m	4-10m	11-15m	16-20m
2	90%	0%	10%	0%	0%
3	99%	0%	0%	0%	0%
7	99%	0%	0%	0%	0%

Table 3. Range of impedance values along survey lines for the Duwamish River. All values are in meters.

Low Energy Environment

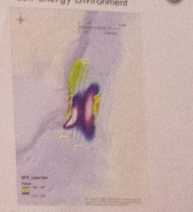


Figure 3. South Puget Sound study site with the transect lines used for surveys.

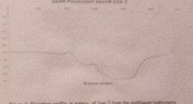


Figure 5. Elevation profile, in meters, of Line 2 from the South Puget Sound study site, created in Matlab to realize depth offsets within the strip data. The offset value for 40 profiles is a portion of the strip line change in elevation that serves to better display the vertical structure.

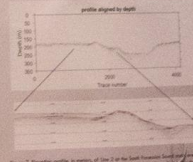


Figure 7. Elevation profile, in meters, of Line 2 at the South Puget Sound study site, created in Matlab to realize depth offsets within the strip data. The offset value for 40 profiles is a portion of the strip line change in elevation that serves to better display the vertical structure.

Line	Min	Mean	Max	Std Dev	Range
2	-2.22	4.88	-0.16	0.58	8.10
4	-7.38	4.87	-0.10	0.79	12.25
6	-2.79	3.92	0.06	0.68	7.60

Table 2. Statistics for seafloor roughness along survey lines for the South Puget Sound. All values are in meters.

Line	0-5m	6-10m	11-15m	16-20m
2	17%	32%	17%	0%
4	22%	32%	22%	0%
6	0%	0%	0%	0%

Table 4. Range of impedance values along survey lines for the South Puget Sound study site. All values are in meters.





John Shim



Edward de Souza





Jacob Woods





Adam Richard





Jiarui, Zhou

Congratulations Class of 2016!

