



Geologist In Residence Program Report

Peter Croal, P.Geol.

Residency Period: June 17 – July 17, 2017



Geology Centre, Shoal Bay, Fogo Island

Acknowledgements

My sincerest thanks are extended to Paul Dean, Coordinator of the Shorefast Foundations's Geologist in Residence program for providing me this rich opportunity, and to the staff of the Shorefast Foundation for tireless and effective support and guidance during my time on the island. Warmest thanks are also extended to Sarah Greene, Geologist in Training from Fogo island, who was instrumental in showing me the local culture, contacts and sites of the island, which would prove invaluable for the Residency, and as well to my wife Judith Kennedy, Wildlife Biologist, who was able to provide very interesting interpretation of plants and wildlife to the Shorefast Inn's guests when on hikes.

Report Format

This report is divided into an account and summary of 7 distinct areas of responsibility during the residency:

1. Familiarization
2. Public Lectures
3. Geology Centre Preparation
4. Youth Engagement Program
5. Guided Walks
6. Canada C3 Engagement
7. Suggestions

Familiarization

Paul Dean provided hike familiarization of the island during the first few days of the residency. The trails included Joe Batt's, Turpins East, Fogo Head, Brimstone and Oliver's Cove. The key geological and interpretation aspects of these trails were identified and discussed. These hikes were supported by Sarah Greene and Judith Kennedy. During this familiarization phase, the scheduling of the hikes through the Inn was reviewed, and meetings with Debbie Doucet, Vice Principal of the Fogo Island Central Academy, were held to discuss the Youth Engagement Program.

Public Lectures

Two public lectures were given during the month long residency on Saturday nights at the Fogo island Inn cinema. One talk was on **Extinctions** (June 24) and the second talk was on **Plate Tectonics and Climate Change** (July 8). Both talks were well attended with full occupancy for the plate tectonic and climate change talk. Each talk was followed by question and answer period and a social gathering at the Inn. Attendees were a mix of guests from the Inn, residents of the island and tourists. Promotion of the talks was done through social media (Geology at the Edge Facebook site, (<https://www.facebook.com/GeologyAtTheEdge/>) personal contacts and a printed poster campaign for the communities of the island.

Geology Centre Preparation

A new addition to the Geology at the Edge program is the refurbishment of Saint Simon's Church in the Shoal Bay community so that it could function as a Geology Centre. Support for the renovation of Saint Simon's Church was provided by Husky Energy and the Shorefast Foundation. Paul, Sarah, Judith and I spent many hours getting the Centre ready for its official opening on July 9. Work included cleaning, map preparation, rock sample labeling and display and organization of the library and other geological resources. Prior to the official opening it was used as a base of operations for the Youth Engagement Program. Sarah was the core custodian and manager of the Geology Centre for the summer. The July 9 opening was a huge success. Guests of the Inn, island residents and tourists were present and numbered over 70 people. Welcoming addresses were provided by Paul Dean, Zita Cobb and Aimee Sheppard of Husky Energy. Once the Centre was opened, Sarah and I made every effort to welcome visitors to the Centre when time and opportunity permitted. The Centre was open to guests in afternoons. Over 25 people representing guests, residents and tourists came to the Inn after the opening on July 9 and before my departure on July 17. Conversations revolved around Fogo Island geology, climate change and the Youth Engagement Program. A tour of the Centre was always conducted. Some images from the official opening follow.



Ribbon Cutting



Paul Dean explaining a rock sample to Centre opening guests



Welcoming addresses by Zita Cobb, Paul Dean and Aimee Sheppard



Island residents attend the opening



Many visitors attend the opening

Youth Engagement Program (YEP)

Instead of doing geological research on Fogo island as part of the residency, I developed a Youth Engagement Program, with the support of Sarah Greene and Debbie Doucet. This program was the first time such an initiative was developed and implemented through Geology at the Edge. The purpose of the program is to install curiosity and knowledge about earth sciences for Fogo Island public school students. High School students were not the focus of this initiative since they were engaged in summer job employment. Core to the success of the YEP was the creation of a survey (Annex 1), which was given to all the public school students from ages 8-12 by Debbie Doucet of the Fogo Island Central Academy in April of 2017. Students were eager with their responses, which demonstrated that they wanted “hands on” and practical activities to do.

Each YEP was held on a Thursday from 2-4pm at the Geology Centre during my residency. Twenty seven students attended during the month long residency. The average age was 9 and each session had an average of 8 students. The activities and subjects of study were:

- Mineral and rock identification
- Geology Centre Flag design
- Basic geology principles
- Shore line walk to examine rock outcrops
- Beach dynamics during a beach walk
- Shells and fossils during a beach walk
- Sand profile study during a beach walk
- Gold panning exercise during a beach walk
- Ocean currents
- Importance of beaches during beach walk

- Gulf Stream importance and the fishery
- Bottle drop for ocean current study
- Recording ocean bottom profile
- Volcanoes
- Minerals in our body and good health

All of these activities were supported by short videos where relevant as well as practical hands on exercises and crafts. Several parents also participated in the sessions with their children. Sarah and I worked together each week to plan for the next week's activities and to source workshop materials. Judith was also supportive in each session. Each session was promoted by the GATE Facebook page, and as the program became more known, through word of mouth. Below are some images of the YEP in action. I made T-shirts with funny statements related to geology and Fogo Island, which were given to the students.





Fogo Island Academy students enjoyed the geology workshops

Guided Hikes

Guided interpretive geology hikes were held during the residency on each Monday, Wednesday and Friday, starting at 10am from the Inn. Fifty three guests participated in the hiking program. Sarah, Judith and I were present for each hike. During this period, there were 3 hikes, which were cancelled since no guests signed up on the respective morning. These cancellations happened earlier in the residency. If the hike was cancelled, Judith, Sarah and I continued to scout the hiking trails and on one occasion we did a hike with one of the staff of the Inn who was very interested in geology. Hikes were divided equally among the following trails: Brimstone Head, Oliver's Cove, Turpins Trail East and Joe Batt's Point. Trails were selected based on weather conditions and hiking ability of the guests. On average the hikes took 3 hours including the drive to the trailhead. Many of the hikers appreciated the interpretation of plants and birds provided by Judith since some guests were more interested in this aspect of natural history as opposed to geology. A particularly unique dropstone (garnetiferous gneiss) was discovered by Sarah on the Oliver's Cove trail. Representative images of the hikes are provided below:



Garnetiferous gneiss on Oliver's Cove Trail



Sarah providing Interpretation



Guests were curious about the garnet bearing dropstone

Canada C3 Engagement

As part of Canada's 150th celebration, a national initiative called Canada C3 (<https://canadac3.ca/en/homepage/>) was initiated in June in Toronto. The expedition ship, Polar Prince, anchored off Fogo Island on July 14 for a 2 day visit. My engagement with Canada C3 personnel focused on 3 main activities, which were supported by Sarah and Judith

- Attend Canada C3 events at the Inn
- Arrange for transfer of 15 bottles prepared by the Fogo Island YEP students as part of a current study.
- Organize hikes for Canada c3 participants.

Canada C3 Events : Sarah, Judith and I attended networking and socializing events organized by Canada C3 in at the Inn. Information about the activities of GATE program were provided.

Bottle Drop: Canada C3 held a community gathering at the Fisherman's Union building next to the Inn on July 15. During this gathering Geoff Greene, Expedition Leader, received the bottles from Dylan and Brooke of the YEP. A photo of the exchange is below:



Dylan and Brooke of the YEP hand over the current study bottles to Geoff Greene

The bottles were subsequently dropped over the side of the Polar Prince in Arctic waters on August 2. Coordinates were:

63 degrees 30 mins North
59 degrees 58 mins West.

It is possible that one or more of the bottles could be retrieved in Europe in 2 or three years. Recovery rates for similar projects are 5%.

Canada C3 Hikes: For the morning of July 15, 2 hikes were arranged. One to Brimstone Head trail, led by me and supported by Judith, which had 8 participants, and one to Joe Batt's trail, led by Sarah, which had 14 participants. Both hikes were lively and addressed many of the geological features of Fogo Island. A photo from the top of Brimstone Head with Canada C3 participants is below:



Tony Janolino (blind Canada C3 participant) makes a recording atop Brimstone Head

Suggestions

Below are some suggestions that could be considered for the GATE residency program for future sessions.

- The Geology Centre could have a geological time line with images showing how Fogo Island came to be over the last 600 million years
- The Geology Centre could have more posters/panels on geological features that are peculiar to Fogo Island.
- Guests of the Inn may welcome a small pamphlet about the Geology Centre, Fogo Island Geology and geology hikes that could be available in their rooms or at reception.
- Guests may welcome self guided trail maps if they do not have the opportunity to hike with a geologist.
- Scheduled “drop in” times could be scheduled for guests and the public at the Geology Centre.
- There could be more public hikes with the geologists as well as hikes with kids and parents.
- Fogo Island geology is most conducive to developing several Earth Caches
<http://www.geosociety.org/earthcache>
- It might be worth investigating whether the Girl Guides/Boy Scouts of Fogo island have done any earth science activities to see if there is room for collaboration.
- GATE is unique in Canada and deserves some media coverage. Perhaps a similar program could be developed at the Banff Centre.
- GATE could have web pages devoted to the profiles and interests of the geologists who have, or will, be Resident Geologists.

- GATE geologists should have opportunities to network with each other over the year to see how all residency programs could be improved. This would include ideas for the Geology Centre.
- It could prove useful for geologists to give talks on occasion in communities as well as the Inn.
- The Inn could have a picture/bio of the respective geologists at the desk or perhaps on the webpage.

ANNEX 1

FOGO ISLAND ROCK HOUND SURVEY

Debbie Doucet (Vice Principal), Sarah Greene (studying Geology at University of Ottawa) and Peter Croal (Geologist) would like to help show you the mysteries, secrets and wonders of the rocks and minerals of Fogo island during this summer. Fogo Island is very famous for its rocks, and people come from all over the world to see them. We have identified a wide range of possible activities for you to be involved in, which are identified below. Please help us by taking a minute or two by giving us your views on these activities so we can identify activities that you would find fun and interesting. I am ____ years old.

| Statement | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| I am really interested in learning about the famous rocks of Fogo Island | | | | | |
| I would like to watch an incredible film called “Chasing Ice” which shows how glaciers and ice are melting in the Arctic. | | | | | |
| I would like to hear Peter and Sarah talk about their experience as a geologist, with pictures from remote field camps | | | | | |
| I would like to bring my rock samples to Peter and Sarah to learn why they are special | | | | | |
| I would like to take pictures of rocks and landscapes that I really like and talk about them with Peter and Sarah | | | | | |
| I would like to post pictures and stories about what I am learning to the Geology at the Edge Facebook site | | | | | |
| I would like to hear Peter and Sarah talk about climate change and how it might affect Fogo Island | | | | | |
| I would like to go on rock and mineral walks with Peter and Sarah to find interesting things | | | | | |

| | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| I would like to volunteer and help out at the new Geoscience Education center | | | | | |
| I would like to do art, stories or photography based on rocks and minerals I have found and seen. | | | | | |
| I would like Peter and Sarah to bring in their rock and mineral collection and talk to me about it. | | | | | |
| I would like to collect rocks and minerals. I would like to help Sarah and Peter develop a treasure hunt (very special geological areas on Fogo Island) that people can do by using their GPS and computer (its called an Earth Cache) | | | | | |
| I would like to buddy up with a friend to make a very short video interview of an older person to discover why they find Fogo Island and its rocks so special | | | | | |
| I would like to go on walks with Mona Brown, Peter and Sarah to learn about why geology affects where plants grow. | | | | | |
| I would like to be part of a contest to design a flag related to Fogo Island and geology that would be flown at the Geoscience Education Centre. | | | | | |
| I would like to help Peter and Sarah show the geological wonders of Fogo Island to passengers from a famous ship that is arriving on July 14 for the day. | | | | | |
| Additional Comments: I have my own ideas of what I would like to do during the summer to learn about Fogo Island rocks. I would like to.....(put your suggestions here): | | | | | |