

Chaitén Vive! Chaitén Lives!

In December 2012, Ted Hamilton and I visited the small town of Chaitén in the south of Chile while conducting field research with an ENVS Mellon Grant. Nearly four years before Ted and I visited in December 2012 – on May 10, 2008 to be precise – the nearby Chaitén Volcano awoke, initiating a massive Plinian event. A rapid response by the National Office of Emergencies – the Chilean emergency management agency abbreviated to ONEMI prevented the potential loss of life from this unprecedented eruption. On May 12th the accumulated ash was carried into the Blanco River by the first rain since the eruption began, causing devastating flooding 10 kilometers down river in the Chaitén town. Regardless of the successful evacuation, flooding and lahars (ashy mudflows) caused an estimated \$12 million in impact to local structures. Several facets of the Chaitén story – the evacuation and the complex question of whether to restore Chaitén at a location that is undeniably at high risk – have guided the focus of this thesis.



From Crest to Coast: Perceptions and Decisions in Geographies of Risk

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Questions

Three complex problems for planners were exemplified by the eruption of Chaitén Volcano but persist in distinct ways in both Southern Chile and the Pacific Northwest. These problems are:

- 1) perceptions of risk don't relate to proximity to a hazard;
- 2) experience with disaster event does not necessarily lead to changes in risk behavior;
- 3) lack of confidence in the government can complicate risk perceptions;

A comparison study of both regions is employed in order to expose the three complex problems facing Chilean and U.S. planners that work to mitigate future geologic disasters.

Background

Both **Southern Chile** and the **Pacific Northwest** sit at the edge of a tectonically active subduction zone; these regions can be considered "risky geographies" due to the diversity of geologic hazards produced by this geologic setting. In Chile tremors are a daily occurrence and large earthquakes, and accompanying tsunamis, occur almost every 40 years. Additionally, the volcanic arc of the southern Andes is home to several of the most active and dangerous volcanoes on the South American continent. In the Pacific Northwest, the Cascadia earthquake and tsunami are due to occur any day and inhabitants fear "The Big One". Although the last destructive eruption of any Cascade volcano was at Mount St. Helens in May 1980, planners and residents are already preparing for the possibility of Mount Rainier erupting. The intent of this paper is to determine how the inhabitants of these two regions adjust in similar and distinctive ways to the risk from local geologic hazards. Furthermore, a quantitative analysis of factors influencing resident's perceptions of geohazards provides a framework for determining appropriate disaster policy.

Methodology

This project is a comparative regional study of the **Pacific Northwest, USA** and **South-central, Chile** utilizing sociological data gathered in both regions by way of analogous surveys. In December 2012 social data was gathered on the perceptions of volcanic and seismic hazards for 136 residents of four regions in southern Chile. Furthermore, mitigation practices and preparedness for a future disaster among inhabitants and planners were studied by way of formal interviews and site visits throughout the region.

Methodology in Chile:

- Sociological survey questionnaire (136 responses)
- Formal interviews with mitigation planners and emergency managers
- Spatial analysis of hazard zone data
- Statistical analysis of survey data

Several studies (Wood & Good, 2005; Davis et al., 2006) that provide quantitative analysis of risk perceptions in the Pacific Northwest were identified. The survey questionnaires used in these studies and the questionnaire used in Chile aided the design of a questionnaire used to gather risk perceptions of Pacific Northwest residents. In spring 2014 survey data was gathered from 40 residents of coastal and mountain communities in Oregon and Washington.

Methodology in Oregon and Washington:

- Sociological survey questionnaire (40 responses)
- Spatial analysis of hazard zone data
- Statistical analysis of survey data

Results

Pacific Northwest Bivariate Correlations Table

Variable	Perceived Risk			
	Composite	Seismic	Volcanic	Tsunami
Composite Actual Risk	.601**	.479**	.781**	-.286
Actual Seismic Risk		.053		
Actual Volcanic Risk			-.471**	
Actual Tsunami Risk				-.651**
Confidence in Government	.047	.141	-.020	-.014
Disaster Experience (years)	-.103	-.069	-.157	.076

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

1) Do respondents' perceptions reflect the real threat they face from natural hazards?

Chile

No, based on correlation tests (Pearson's) of perception indices neither composite nor hazard specific risk perceptions in the Chile sample population reflect the actual hazard zonation for their households.

Pacific Northwest

Yes, based on correlation tests composite, volcanic, and tsunami risk perceptions reflect actual risk. Seismic risk perceptions only reflect the composite risk index.

2) Does recent experience with a hazard event lead to more accurate perceptions of risk?

Chile

Neither experience with a hazard event (disaster experience variable) or experience with a disaster (disaster effected variable) led to altered perceptions. The length of time that respondents had lived in a location was strongly and negatively correlated to their perception of seismic risk.

Pacific Northwest

Experience with a hazard event, based on correlation tests, has little influence on altering risk perceptions.

3) Does a higher confidence in the governments ability to respond to a disaster lead to reduced personal preparedness?

Chile

Higher levels of confidence in all levels of government (local, regional, national) had no influence on risk perceptions among the Chile sample population.

Pacific Northwest

Higher levels of confidence in all levels of government (local, regional, national) had no influence on risk perceptions among the Pacific Northwest sample population.

Chile Bivariate Correlations Table

Variable	Perceived Risk			
	Composite	Seismic	Volcanic	Tsunami
Composite Actual Risk	0.04 *	0.13 *	0.02 *	0.07 *
Actual Seismic Risk		0.17 *		
Actual Volcanic Risk			-0.07 *	
Actual Tsunami Risk				-0.01 *
Confidence in Government	-0.01 *	0.001 *	-0.04 *	-0.01 *
Residency (years)	0.03 *	-0.301 **	0.06 *	-0.201 *
Disaster Experience (years)	-0.03 *	0.03 *	0.04 *	0.09 *
Disaster Effected (years)	0.03 *	0.05 *	0.09 *	-0.30 *

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
-. N < 136

