

# Ground Truth: Weather and Climate Observation and Embodied Experience in Antarctica

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## Introduction

Throughout the world from Antarctica to Greenland to the middle of the Pacific Ocean, people are stationed in remote, uncomfortable and hazardous locations for the sole reason of observing and recording the weather. Meteorologists, military and commercial pilots, air traffic controllers, and many others depend on this information (what they call 'ground truth'), despite instruments that can provide precise and often much more detailed information without endangering human lives.

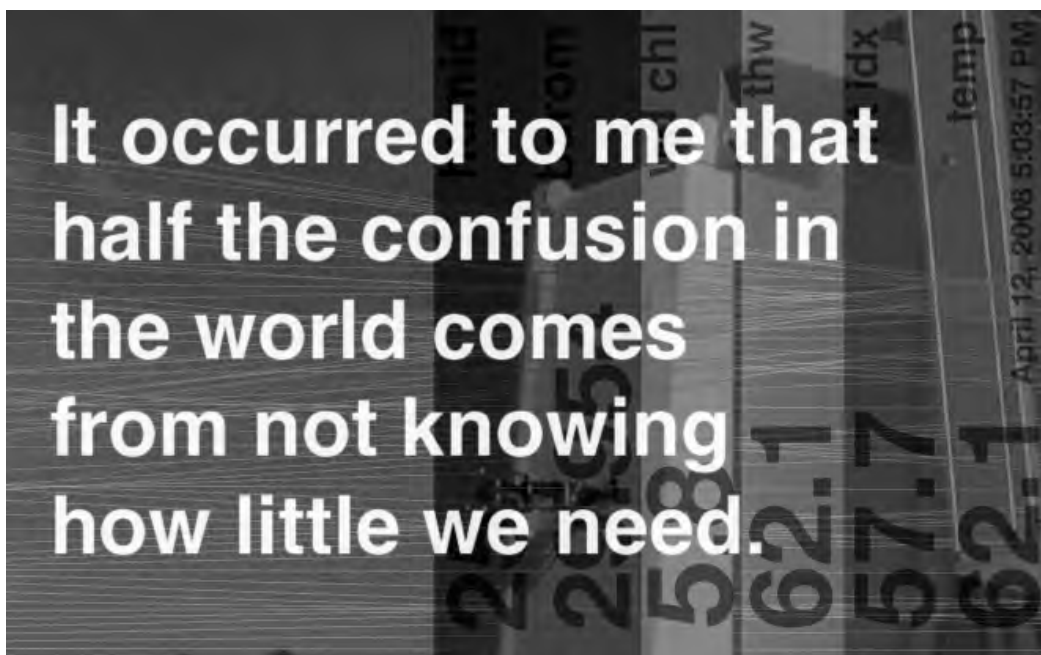
Why, with sophisticated instrumentation and remote sensing, do we depend on humans on the ground looking up at clouds? What is the meaning of 'ground truth' and can it inform and enhance our relationship with the environment? The project *Ground Truth* attempts to answer these questions through a short documentary featuring interviews and documentation of weather observers at the South Pole and McMurdo Station, and of weather and climate scientists as they discuss, maintain and gather data from remote sites on Ross Island and

the Dry Valleys of Antarctica, and a temporary public art installation of an automatic weather station with real-time visualization and sonification of weather variables.

## Project background

The *Ground Truth* project emerged from my National Science Foundation Artist's residency from December 2007 — January 2008 working alongside scientists gathering weather and climate data. I traveled to the McMurdo Dry Valleys Long Term Ecological Research Project field camps and the Antarctic Automatic Weather Stations, and to the geographic South Pole to document weather monitoring, including a daily balloon launch and one of the most advanced weather stations in the world. My initial project, *90degreessouth.org*, was designed to communicate both the aesthetic beauty and the scientific importance of Antarctica to global climate. Although the project could have been done at any time, it is especially important in 2007/2008, the International Polar Year, because it examines the region's impact on global climate.





*90degreessouth.org* began as a blog featuring soundscape recordings, audio interviews with scientists and a large database of images. With the help of Hunter College Integrated Media Arts MFA graduate Sha Sha Feng, the project is now developing into an online interactive mapping project using rich media in Google Earth, YouTube and Flickr to present interviews, sound, video and other media related to Antarctic weather and climate.

While working at McMurdo Station, I found there was a great interest in the soundscape among the community, and that Antarctica contains some of the most unique and unusual sounds in the world. I held a series of field recording workshops called 'sound walkabouts' that resulted in an electro-acoustic concert called *Sonic Antarctica*. *Sonic Antarctica*, now being developed into an audio CD, is a collection of field recordings and soundscape compositions celebrating the diverse sound environment of Antarctica. From these two projects, the *Ground Truth* project evolved.

## Project development

One of my interviews was with Don Voigt of the Pole Net project, a large-scale project to place passive seismic sensors along almost the entire Trans-Antarctic mountain range. Our conversation was one of the first times I heard the term 'ground truth':

"...part of what we were doing was sort of 'ground truthing' where we were getting very detailed information about the ice...because you can get features in the radar data that unless you've been on the ground and looked, you don't know what those features represent." Don Voigt, audio interview on *90degreessouth.org*

I learned that there are many more humans observing the weather in Antarctica than automatic weather stations and began interviewing scientists about the purpose of the human observers. Dr. John Cassano, professor of meteorology at The University of Colorado Boulder and a principal investigator on the Antarctic Automatic

Weather Station project this year, said:

“I think there’s a real value to human observers... being on the ground and seeing what a place is like and seeing what the weather is like there gives you an intangible sense of the location and improves your interpretation and your understanding of what your computer model or the weather data is telling you.” Dr. John Cassano, video interview on *90degreesouth.org*

Dr. Andrew Fountain, who now leads the Dry Valleys Long Tern Ecological Research project, echoed Dr. Cassano from an ecosystem monitoring perspective:

“Just because you have the data doesn’t mean you understand the system. It’s important to come down and view the landscape and in our case view the glaciers, and seeing how the glaciers are reacting to these changing environments, and that kind of feeds into our understanding and our non-quantitative knowledge.”

While conducting interviews with scientists, I read many historical accounts, one in particular was written by the early 20th century explorer, Richard Byrd. His book *Alone* published in 1938, tells the story of his solo winter-over at an inland camp. Byrd wrote a lot about weather phenomenon and instruments. Here he speaks about his physical and emotional connection with these machines while living alone in Antarctica:

“... if anything was eventually to regularize the rhythm by which I should live at Advance Base, it would not be the weather so much as the weather instruments...If I had any illusions as to being master in my own house, they were soon dispelled. The instruments were masters, not I.”  
Richard Byrd *Alone* p. 52

In his diaries, Byrd talks several times about what I see as a kind of symbiotic relationship between himself and the weather instruments:

“Ah, yes. Tick-tick, tick-tick-tick, tick. The busy, friendly voices of the register and thermograph on the shelves, each distinct and dramatic- sounds I can understand and follow...As I dread getting up, I just lie and listen to these sharp, clean beats, letting them form little conversations, little rhymes, even short stories in my mind,” (Richard Byrd *Alone* p. 76).

The short documentary includes excerpts from the interviews with scientists and the temporary public art installation consisting of a modified weather station interpreting data in real time gives audiences have the opportunity to learn about the kind of instrumentation used by the scientists and experience the data being collected through visualizations and sonifications. The visualizations include video footage of Antarctic weather stations and quotes from Richard Byrd.

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