FEATURE

POLAR PATTERNS

Philip Samartzis went to Antarctica to record the sound of wind, which ain't easy when it's travelling at cyclone level velocities.

Story: Mark Davie

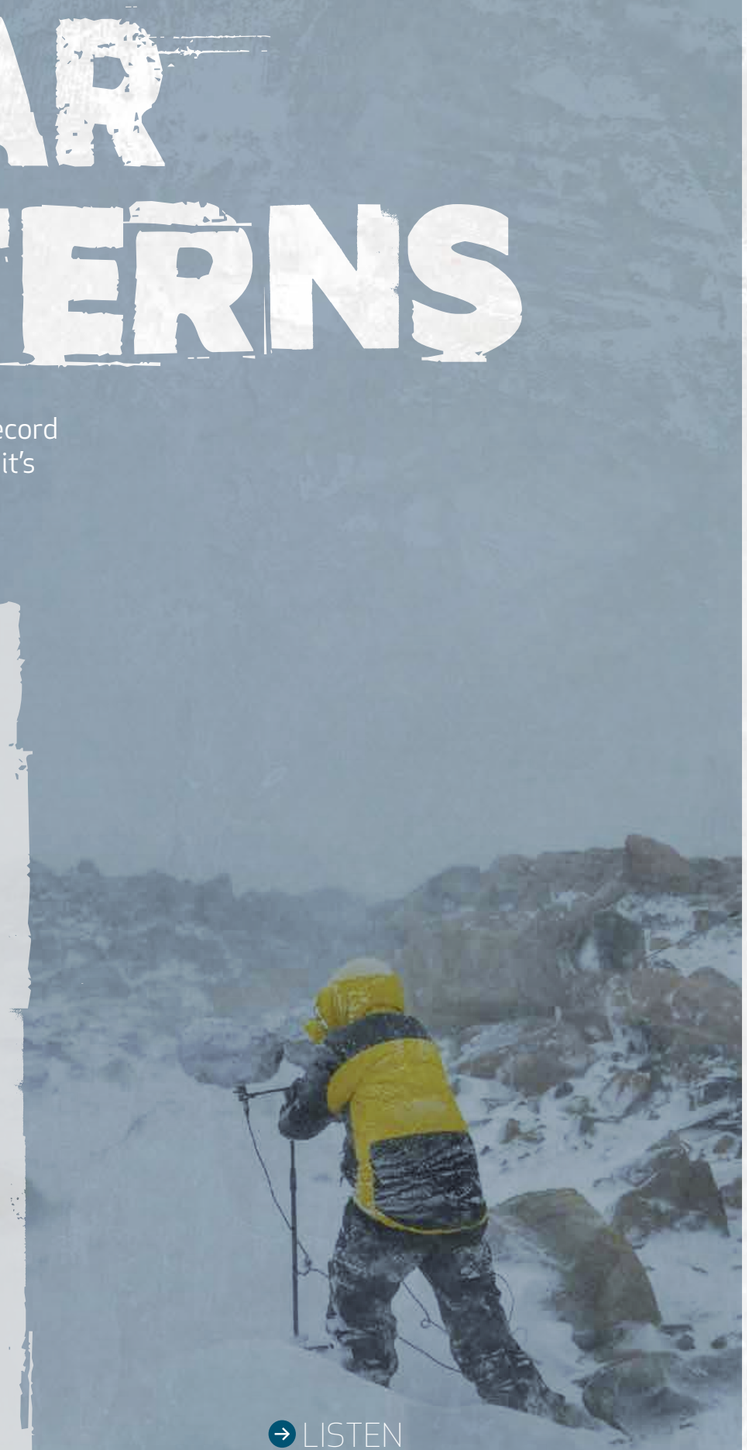
Philip Samartzis does what any other audio engineer does; he records air molecules vibrating. It's just that the molecules he's trying to capture are caught in katabatic winds pulling ice and snow across the Antarctic sheet at speeds over 100 knots. That's Cyclone Tracy level velocities. They call that a blizzard down in Antarctica; from the safety of the mainland, I call it madness.

Samartzis is an associate professor at Melbourne's RMIT School of Art. His trip to Australia's Casey station last year was the second time he'd visited the Antarctic region. The first was a three-month long jaunt in 2010 that covered six weeks at the more remote Davis Station, followed by time on the sub-antarctic Macquarie Island (roughly halfway between Hobart and Antarctica) before heading home. Navigating between each place took two weeks aboard an icebreaker, which added Southern Ocean sea sickness to the blizzards. "There's no room for the weak!" said Samartzis. "You've got to be uncomfortable to get those recordings."

Both trips were funded by Australian Antarctic Division's Arts Fellowships, which is open to anyone who works in a medium other than moving image: poets, photographers, writers, and sound artists like Samartzis.

His first trip to Antarctica was an eye-opener. Davis Station houses around 65 people during the summer, less than half that during the winter. It's a mix of tradies, scientists, forecasters, comms guys, pilots, station management, and they each have their own cliques. Unlike the Americans, who hire cleaning and cooking staff, the Aussie contingent assumes a socialist-inspired dynamic where everyone pitches in. The downside of this communal station life is a lack of privacy; every area is common, living quarters are shared, and you can't go outside alone on the off chance you get caught in a blizzard or fall down a crevasse.

"Isolation does weird things to you. It affects your psychology, I was unnerved after three months," recalled Samartzis. Which is not to say he didn't enjoy it. On the contrary, as an artist Samartzis thrives on those sorts of tensions; observing the rituals and social dynamics of the alpha male, risk taker tradie who's off-his-face the entire time, while the 'governance of station' crowd desperately tries to manage that rampant drinking. Samartzis describes Antarctic life as "a cross between a youth hostel and a ski lodge. Everyone's running away from something." Anthropology skating on thin ice.



LISTEN

To hear the results of Philip's Antarctic adventures, head to bogongsound.com.au/projects and click on the Polar Patterns and Antarctica tabs.

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ROBUST RECORDERS

Philip Samartzis: "I've always worked with Nagra field recorders. As a student it was the Nagra IV, then the digital range came out, so I got a Nagra VI and an ARES-BB+. I took those digital recorders as well as a handheld one to Casey. They're incredibly robust; they've been frozen, left out in the field for days at a time, and continued to work.

"There are limiters on the VI, but not on the ARES. One of the real issues is setting gain when you can't monitor the signal. It's impossible to gauge the threshold of a blizzard, especially when you have to wait 12 hours for it to reach its peak. Bruel & Kjaer leant me one of the LAN-XI Notar recorders. It's a digital solid state recorder which has no gain structure. You just activate it and normalise the recording afterwards. It has no noise and you don't have to worry about getting the gain level right. However, it's a four-channel recorder that costs something like $30,000, so I couldn't buy one myself. Without it, having a conservative guess at a gain level mostly ends up with fine recordings."

The tension went deeper than humans interacting with other humans, it was clear to Samartzis there was tension between humans and the continent itself. "Antarctica is not all seals and penguins. It's the sound of stations, and they're very loud, complex environments," explained Samartzis. While he somewhat aligns with groups like the Canadian Soundscape movement insofar as letting the field recordings speak through the composer, not forcing his own agenda on them. He's also not going to blinker his mic's perspectives to take in only the beauty of the environment while ignoring the discarded fuel drum, the mummified body of a seal, or the plume of smoke from the incinerator burning station waste. "It's a natural place and wildlife preserve, yet within that the cost of human habitation is quite high in terms of impact and contamination," said Samartzis. "That's what I'm interested in, that paradox of our very act of preservation destroying the place at the same time."

All of that ultimately infused itself into the composition. "What I ended up with wasn't beautiful studies of Weddell seals and penguin colonies, it was about getting that dynamic of tension infused into the work," said Samartzis, besides "Doug Quinn did that in 2000, and released a fantastic CD. I could never surpass it, it's the standard. I focus on the dysfunction instead."

SONIFYING THE ATMOSPHERE

Over his trips, Samartzis has crafted a number of remarkable compositions. As well as documenting the sounds of icebreakers, helicopters and other machinery humans use to navigate Antarctica, he's also stuck a DPA 8011 hydrophone down a hole in a frozen lake to record the sound of it flexing with the thermal energy of the sun. He's captured the harsh squawks of a radar station beaming coded sine tone signals into the ionosphere to detect turbulence in the solar wind. With accelerometers attached to the radar array, you hear the real local stress of cold metal fatigue mixed with intermittent blasts of signal sent to probe space kilometres away.

A fascinating project was sonifying the Aurora Australia. "One of the engineers at the station created a software program to transpose the infrasonic sound of about two hertz into the audible frequency range," explained Samartzis. "He took one year of data and transposed it for me, whereby each day of the calendar year is rendered down to about four seconds of sound." It sounds like whip cracks and lightning, mixed with wind hitting the side of a thick tin shed.

His latest project is to translate his recordings of the effect of katabatic (low gravity winds that begin at the pole and speed up as they reach the coast) wind-induced blizzards on Casey station into an exhibition. It's called *Polar Patterns*, a name I aped for the article… because 'c'mon!' How are you going to do better than that?

WINDING IT UP

Recording wind is not easy, and prior to this trip recording katabatic winds was almost impossible. "Most people associate wind against a mic as a blaring sound, and most of what you hear on TV and films is exactly that," said Samartzis. "It's not really the sound of katabatic winds."

Out in the field, Samartzis used DPA 4006 omni mics which needed extra-special protection given one of the blizzards was the strongest ever recorded at Casey, exceeding 100 knots. He ended up procuring a set of Rycote's new Cyclone windshields, adding fuzzy jammers over the top. "Rycote actually built them for me to take down there," he said. "They were in production, but they hadn't gotten around to building the models to house the 4006s. I wrote to let them know I was heading to Antarctica, and to find out if they could make them for me. They built four to take down and test. This project was about recording wind, not reducing or mitigating it. The Cyclones were really amazing because they removed all the turbulence of wind moving across the diaphragm, leaving just the sound of wind as you experience it in the environment. I couldn't have got that sound without the Rycote Cyclone wind shields, it would have been a different effect."

For two hours, Samartzis sat out in a -20°C blizzard recording the effect of the katabatic winds. By the end, when his body couldn't take anymore, the windshields were frozen solid and his Nagra VI recorder was a block of ice, but still working. As well as the sound of the 100 knot wind, you can hear the granules of ice pattering against the stand.

Samartzis layered that recording with a host of other recordings made during a 36-hour blizzard event. He placed accelerometers on restraining cables, ambisonic microphones in vents, and other microphone configurations around the station to pick up the effect of the blizzard on the station. Then he set gain levels on his recorders and hoped for the best while he was trapped inside. You can check out the eight mic placements and descriptions Samartzis used to create his composition on the station map.

The entire effect is unnerving. Because the recordings are gathered from all around the station, from both interior and exterior aspects, the soundscape makes you feel at once protected from and exposed to the elements. The moment you lock onto the sound of an interior air vent and feel a sense of comfort at being inside, that feeling is stripped away the second you realise you're simultaneously standing right in the middle of a freezing -20-degree, 100-knot blizzard with ice granules catapulting into your face.

There was tension even in this one human listening back to Samartzis' recordings a continent away from Antarctica.

HOW TO RECORD A BLIZZARD AT CASEY STATION

1 BUDNICK HILL

Location Info: Hilltop lookout positioned above station

Equipment: B&K 4198 omnidirectional microphone

Purpose: To record the effects of the blizzard upon the natural environment.

2 SCIENCE BUILDING

Location Info: Marine, remediation and atmospheric science labs.

Equipment: Two DPA 4060 miniature omni mics

Purpose: To capture ambient recordings of the interior laboratory spaces.

3 RED SHED

Location Info: Living and sleeping quarters of Casey Station residents.

Equipment: Two pairs of DPA 4006 omni mics

Purpose: To record the effects of turbulence and stress upon various interior spaces, as well as the direct sound of the blizzard from cold porches.

Philip Samartzis: "The first microphones I bought were 4006s. I did a number of residencies in the late '90s, and one of them was at the Danish Institute of Electroacoustic Music. The engineer there, Klaus, was a legend within the Danish alt-rock scene. I was getting tired of working with synthesis in the studio, and I wanted to get some microphones for field work. He suggested the B&K 4006s because they're versatile, and you can do whatever you want with them. I got them in 1997, and still use them. I got an additional pair from DPA for Casey Station. They're highly robust and can deal with -20 degrees."

4 ATMOSPHERIC RESEARCH HUT

Location Info: This hut is located outside station limits and its location exposes it to high velocity winds.

Equipment: B&K 4198 omnidirectional microphone

Purpose: To capture the force of the blizzard on a wooden structure and its sets of scientific instruments including an anemometer.

5 EMERGENCY VEHICLE SHELTER

Location Info: The building is specifically positioned to absorb the main trajectory of the blizzard as it flows down Law Dome and out to sea.

Equipment: Soundfield microphone

Purpose: To capture an ambisonic recording of the interior. The orientation of the mic was steered toward the rattle of the overhead vent and rendered down into a stereo configuration for the exhibition.

Philip Samartzis: "The ambisonic mic allowed me to capture a surround experience of an air vent in a fire station, and fold it down into stereo. You get the whistling and clattering, but the subsonic rumbling at the same time. I'll find a use for the surround information in another exhibition, but in this instance, I've creatively decided to take that experience and focus on the ceiling sound by changing the perspective of the mic. I used it for interiors because it's a little more delicate."

6 MOBILE HANDHELD RECORDER

Location Info: Interiors Samartzis could access during the blizzard

Equipment: Nagra SD handheld recorder

Purpose: To gather additional stereo recordings from different interior locations.

7 VEHICLE REFUELING AREA

Location Info: Gas and fuel dump

Equipment: Two B&K 4518-003 accelerometers

Purpose: To document the sound of wind and ice upon metal surfaces including 44-gallon fuel drums, gas bottles and steel crates.

Philip Samartzis: "I was a bit concerned with only recording wind. I contacted B&K, and they suggested working with industrial style contact microphones that are used for vibration purposes. They have an operating range of something like -50 to 250° Celsius. They're designed to be put on hot motors or frozen items. They sounded fantastic, and a lot of the things they pick up aren't discernible to the naked ear."

8 IONOSONDE RECEIVER

Location Info: Outside station limits on the edge of Vincennes Bay.

Equipment: Two B&K 4518-003 accelerometers

Purpose: To document the sound of restraining cables used to stabilise the Ionosonde radar system.

Nicholson Island

1 Budnick Hill

STATION LIMITS 6

Crane Cove

Geoffrey Bay

Wharf

Storage Rack

Lower Fuel Farm

Ionosonde Receiver 8

Ionosonde Hut

Ionosonde Transmitter

STATION LIMITS 5

Old Carpenters' Workshop

IRIS Siesmic Vault

Boat Shed

Unsafe Area – Crevassing

Thala Valley

Memorial Cross

Waste treatment outfall

Reeve Hill

STATION LIMITS 4

Quarry as surveyed February 2013

Magnetometer

Riometer

STATION LIMITS 1

Shirley Island Walking Route

Australian Regional GPS Network Receiver

STATION LIMITS 2

Magnetic Variometer Hut

Atmospheric Research Hut 4

Magnetic Absolute Apple

STATION LIMITS 3

CAUTION: Absence of the depiction of crevasses does not indicate a crevasse free area

0 100 200 300 400 Metres

Storage Rack

Legend

Station search zones

- Mast
- Antenna
- Transmit Mast, Antenna
- Danger RF non-ionising Radiation DO NOT TOUCH MAST, ANTENNA
- Helipad with / without facilities
- Rock/ Ice Cliff
- Contour (Interval 10m)
- Road