

The Spirit of Adventure

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I'd like to talk to you about the polar regions today, South Pole and North Pole. I'll try not to lay it on too thick with the environmental science but come out with a few observations that I've made in the course of doing the trips that I've done and tell you a bit of an adventure story and a bit about what it takes to do these kinds of expeditions. I'll give you some environmental observations along the way.

I had a few little technical problems with one or two aspects of this presentation, so bear with me. The weather today makes this very conducive to talk about Polar Regions doesn't it? Just by way of a bit of a background, yes I work with URS. I roughly divide my work into three's, I work in the overseas aid section and I'm a sustainability advisor to a number of oz aid programs. I work with people in the Solomon Islands a very major, very real issue for them is sea level rise and at the moment we are experiencing about a two millimetre a year sea level rise. That is the United Nations figure and it is really pretty much beyond dispute. I work also in the areas of environmental auditing and management system implementation. I guess I get to see what is coming out of the stack at the pointy end of business and work also with farmers in the Murray Darling basin system. I'm a soil scientist by original training.

The other side I guess is that I do a lot of wandering around in these places, south and north. I've been five times - three times south, twice north. Just to give you a quick inside there will be a film out on the ABC hopefully towards the end of this year, maybe early next year. I attempted to retrace Sir Douglas Mawson's journey. Mawson is of course the balaclava wearing guy on the old hundred dollar note and I tried to deprive myself of the food to the same extent as him, wear the same clothes, pull the same kind of sled, eat kangaroo jerky as a substitute for dogs, so don't worry. I was quite happy to eat - I've actually eaten dog but the ABC wouldn't have it and it was a very, in all honesty a very humbling experience to see just what it was that those guys must have gone through, because to them they had no opportunity of rescue, whereas for me there was that opportunity.

I put that shot in to show you that there is a glacier in the background and that is about two kilometres wide. That represents a pretty small one in the scheme of the Antarctic. The widest glacier in the world is the Lambert glacier, it is about one hundred kilometres wide its actual width, its length is more like two thousand kilometres, so an incredibly large scale that we are dealing with down there.

Like I say, I don't want to hammer on too much about the science behind the environmental issues but I take it that most people have seen the Gore film and perhaps even the ABC/Channel 4 debate film thing the other night. I can't be too critical of Channel 4 because they are part funders of the Mawson program, so I won't say anything too negative about it.

This greenhouse effect gets a lot of press - fundamentally, it's a natural process and there is a term called the goldilocks principal which says that Venus it too hot, Mars is too cold and earth is just right.

It is really due largely to the fact that we have a layer of greenhouse gases, which allow a certain amount of heat to be trapped on the planet, which allows conditions conducive for us to live, so it's not a bad thing. The issue really is the amount of greenhouse gas in the system, which is causing the problems. It basically comes in the form of short wave radiation and some is bounced back into space, some gets radiated back and some gets trapped. This is because the short wave incoming radiation becomes long wave when it is omitted back out and it is trapped by the greenhouse gases, like methane and carbon dioxide causing warming.

We are experiencing - if the United Nations figures are to be believed the inter governmental panel on climate change we are experiencing about a point six of a degree temperature rise globally in the twentieth century, roughly. Now whether or not you want to attribute this to the carbon omissions we are putting out into the atmosphere is obviously the big-ticket question at the moment. Personally, I think it's more or less beyond dispute that we are largely responsible for this. Given that since the industrial revolution times, 1750's up to the present time, we have seen carbon levels in the atmosphere go from about one hundred and ninety past a million to sort of three eighty which they are at the present time and they're going up by three parts per million on an annual basis at the moment. That's an increase by about two parts per million. So it's increasing, and increasing and by 2100 United Nations again are reckoning that we are going to experience somewhere in the region of six hundred and fifty parts per million of carbon dioxide in the atmosphere, with a corresponding temperature rise of maybe one and a half to two degrees. I'll talk a little bit about the Antarctic and say what that might mean for us.

I've spent a lot of time in Russia, they don't really generate electricity by any means other than burning coal it seems. You go there and everyone is chucking coal around everywhere to generate heat. We are putting somewhere in the region of seventy million tonnes of greenhouse gases into the atmosphere each day as a collective unit.

Just some implications for up north, this map shows two things, it shows permafrost which is that layer of permanently frozen ground, that's in the purple, that's how it currently stands. It's the areas here and this is the furthest south that it goes. This white area here is basically the Arctic ocean. A very, very - it's an ocean which doesn't have openings into other oceans effectively between Greenland and Iceland and parts of Russia over here. Very small gaps really and then you've got the Bering Strait on the other side. Largely that ocean is completely very much land locked. Any trip to the North Pole this isn't a typo, any trip to the North Pole basically involved walking on the surface of the frozen ocean, there is no land up there as such, it's about a thousand kilometre walk on the ocean. If you are interested in doing that trip, you obviously need to know the ocean is going to be solid enough to walk on and I'll talk about that in a second.

The situation predicted by the inter governmental panel on climate change of winter, that last slide showed what the full extent of winter ice is, this is the predicted extent of winter ice by 2070, 2090. I'll show you a couple of slides in a moment but I can tell you for a fact that when I stepped off the northern most coast of Russia expecting to step onto solid ice there was just ocean there and I actually had to get a helicopter out to the nearest piece of floating ice and start from there. You are already starting to see the implications of it.

In Russia they're experiencing terrible problems with permafrost melt and very obviously this is sort of structural problems with buildings collapsing and pipe lines rupturing and that kind of thing. A very serious issue for the insurance sector into the future I suspect and also releasing a huge amount of methane as it melts. A lot of the decaying organic material that is currently locked into the frozen layer of soil is going to release into the atmosphere. Methane of course is eight times more problematic within terms of its greenhouse capabilities and carbon dioxide, so that is an issue waiting to happen.

Yeah, what are the implications for your would be polar explore? Well this is me sort of wandering around up there at the end of the winter. If you want to do a trip up north, you have to go at the end of the northern hemisphere winter, otherwise when you step off the land on either the Canadian or the Russian side you're going to find water so you have to go in the winter when the ice extends all the way down to the coast. The ice up there isn't very thick, you're talking about maybe ten centimetres thick at the northern most tip of the Russian islands. Siberia perhaps twenty centimetres and about five metres thick at the actual pole itself.

I don't know if anyone saw there was an article in the paper today, in The Australian about a guy who was swimming around in the North Pole, did anyone see that one? I mean that is a little bit of misreporting really I mean, this floating mass of ice is floating around all the time and you get leads, as they call them, opening up all the time and so the North Pole is often on the day you get there you just have to hope there is a piece of ice that is floating over ninety north, otherwise there is not going to be a North Pole for you. It is constantly moving around so you do get opportunities to swim at the North Pole if you are stupid enough to want to do that. For me I wanted to walk there so of course I needed to know that it was going to be solid enough.

This is about three hundred kilometres north of the Siberian coast still with the sun very low on the horizon, ensuring the temperatures are cold enough for the ice to be or for the ocean to be frozen. But this is what I saw when I got to the northern most tip of the northern most island off Siberia, it's called October Revolution island. It's a wonderfully enigmatic place it's full of old Russian early warning stations and everything is in a state of decay but it's really fascinating to go around and it's a real James Bond kind of stuff. They've just literally dropped tools, left everything as it is, and a lot of the stuff is just buried in the ice including PCB's and all sorts of other nasties. You look beyond that and it's a fascinating place. But in all honesty there was about twenty kilometres of open ocean where we had in previous years experienced solid ice up to twenty centimetres thick, which is thick enough for someone of my size pulling a hundred and fifty kilo sled to actually walk on. Any thinner and it's just too thin and you obviously fall through. The locals there were saying that the area hadn't frozen for ten years and it's getting worse. I think we are seeing a definite retreat of the ice from areas where we did get winter ice right up to the coast.

A journey to the pole consists really of leaping from one piece of moving ice to another, it's a pretty dangerous trip because you can never predict where the ice is going to open up and you pitch your tent on something that looks solid and during the night it can open. So the sled design had to ensure that if that did happen we could jump on the sleds and they would float. So all sorts of design considerations when planning a trip up north and of course you get these spectacular icebergs just frozen into the ice. It is just a journey of leaping from one piece to the next for a thousand kilometres.

In terms of broader implications for us, what currently happens is obviously we have a lot of incoming solar radiation down at the equator here, this shows the sea bed. The Arctic Ocean is two thousand metres deep but it is actually very shallow compared to the other oceans, it is the shallowest ocean. At the moment what happens is that a lot of the incoming solar radiation gets reflected back out by the ice over the pole and so it keeps the Arctic ocean very cold and that results in sinking of water and that sinking water moves from the north all the way back down towards the equator. Correspondingly the warm heated water at the equator actually moves back up north towards the pole and you end up with circulation happening. It's called the thermohaline circulation and it's largely responsible for keeping a lot of the cities in Northern Europe free of ice, whereas otherwise their latitude would be such that they'd probably experience ice for a much greater period of time during the year.

This is it very briefly, basically orange is higher and purple is lower, so you are getting the cold sinking water coming down from the Arctic because of course you've got this area of ice up over the ocean reflecting a lot of the incoming radiation back out to space about eighty percent. The cold water comes

down and you get it replaced by warmer currents coming from the south and this circulation is global, I don't want to talk too much about that. But obviously the implications if we melt this very, very thin layer of ice on the surface of the Arctic ocean are pretty major for us.

This is not one of my slides, I didn't come across this, but I quite liked it, it is an American nuclear sub that has just surfaced at the poles. So it just goes to show you that really you are not dealing with large thicknesses of ice this is probably only two metres thick. The Russians not to be out done sent a nuclear powered icebreaker and went straight through the pole. It is quite something when you are walking on what you kind of in your own mind perceive to be a solid surface and you see a ship coming, you know, so <inaudible>.

There are very interesting things that happen to you in the course of a trip up north. Down south which I'll talk about in a second, is at least a solid land mass and you achieve a certain distance covered each day and when you get to the tent that night you can sit there and switch on the GPS and see how much you've done and you can sort of mentally start to breakdown the enormity of the task into manageable pieces, constantly sort of chipping away and moving forward. In the Arctic there is a very real possibility of being shunted backwards by this ice and that happens quite often. We ended up on a conveyer belt of ice going the wrong way for quite a period of time and eighteen kilometres backwards we went one day and you are only travelling about twenty forwards so it's pretty demoralising. It means that you have to come up with a whole series of mind games to play to motivate yourself.

This is a great shot; this is a polar bear in Hudson Bay in Canada. We actually started to experience polar bear drowning because their adept swimmers but we are getting a situation now where they are happy to swim from ice flow to ice flow and are actually drowning out in the ocean, something that hadn't been reported before and this is anecdotal of course but something that had never been reported before. There are about twenty thousand something polar bears up there. Interestingly when you go there because you go at the end of the winter, in order for the ocean to be frozen enough to actually walk on you are going at the same time as the polar bears kind of emerge from hibernation and are hungry. See a couple of slow moving guys pulling sleds make a perfect target so we got harassed quite a bit by bears and luckily didn't have to shoot one. I often say this but I borrowed a gun off an old grizzled old Norwegian hunter on my first polar trip and it was a bolt action Lee Enfield 303. It was in other words you've got one bullet in the breech and one more and I've never used one of these things before so I said to the guy, what happens if I miss, referring to how the hell do you reload one of these things, and he said, my friend you miss one of them you deserve to die. I took his point.

Switching south this is a shot taken at Macquarie Island and you aren't actually allowed to land because of the penguin colonies there. This is a massive penguin colony as you can see, there is about a million breeding pairs there and sitting in amongst it conspicuously are these things known as digesters which were used historically for chucking penguins in and melting them down to get oil for lubricating bullets and machinery and stuff like that, nice stuff.

Our relationship with the Antarctic has been a little bit questionable. Following penguins we got involved in fairly extensive seal culling, again for the oil, this is an immature male elephant seal probably two years old and it's got a lot of blubber, they're amazing creatures. The mature males are five tonne animals they are five or six metres long and they just lumber along, lumber along. We used to melt them down similarly for oil and of course whales again and this is a sort of money shot that I fluked off a ship. We took down a group of ninety photographers they were all on one side and I was on the other side, they popped up my side and I took the picture and kept quiet, it is just a lucky shot. But certainly whaling was also something that we were fairly extensively involved with and I put these in to demonstrate the fact that our relationship in the Antarctic has only gone back about a hundred years and we managed to cause quite a lot of damage in that fairly limited time scale. The first person to actually spend the night on the Antarctic was in 1895, so we've really only had a kind of a hundred

and twelve years of physical contact with the place and we've managed to cause quite a lot of disruption already. Now these are obviously killer whales, they've never really been hunted but the southern right whale is very popular. It is known as the right whale because it was the right whale to hunt, so when you harpooned it, it didn't sink, hence the name the right whale rather than the wrong whale presumably.

What was I attempting to do when I was down there, I'll just give you a bit of a background about my South Pole journey and then come up with a few little environmental observations I guess. Just to give you an idea of the scale, this is obviously Australia. Australia is seven point eight million square kilometres in size and Antarctica is that much bigger it is about fourteen, so it's getting on for twice the size. I won't go into it too much here but there are actually four poles, it's the South Pole which is the one that I was interested in getting to here, which is the point which is the most southerly point on the planet. There is the magnetic pole, which is the source of the earth's magnetism and it's caused by molten rock swirling around in the core of the earth. Both the south magnetic pole and the north magnetic pole are nowhere near there, the geographic poles at either end, they're about fifteen hundred, sixteen hundred kilometres away from the geographic poles, hence the variation you get on your compass when you are looking at the magnetic or true north. You've got a couple of other ones that have been thrown in, the geomagnetic pole is where the magnetic pole would be if the earth were uniformly magnetic, which of course it is not for some reason. And the wonderfully named pole of relative inaccessibility which is a Russian construct and they had to come up with a complicated name. It's the point on average furthest from any geological coast line and you can just see how distorted the map of the continent is by the ice given that, that doesn't look as though it is furthest on average from the coast, looks like it should be there but it is because the ice distorts the map.

How much ice? Well this is all ice here of course; this is a mountain range probably three thousand metres high just poking through this mantle of ice. A vast amount of the fourteen million square kilometres of the Antarctic, we've got about two kilometre average thickness of ice over the whole of that, that's an average figure. So some places far thicker, other places obviously a little thinner. You've got fourteen million square kilometres times a two kilometre thickness you've got twenty-eight million cubic kilometres of ice in that cap. Imagine one cubic kilometre is a vast piece of ice; you've got twenty-eight million of those. It's about ninety percent of the world's fresh water by some estimates, certainly between eighty and ninety percent. There is about two swimming pools worth of drinking water for every man, woman and child at the current population level in the Antarctic cap alone. If we were to get melting of that cap, which again to go back to our friends at the United Nations, could happen with say a two degree rise in temperature, we could see that melting within a six hundred time frame. We'd end up with about a ninety metre global sea level rise, which would be a very interesting thing.

Just incidentally that slide, this is a called a * basically a rock outcrop, it's a word taken from the northern hemisphere, from the Inuit people. It's really the summit of a mountain and that mountain there is about three and a half thousand metres high, only the top three hundred metres actually sticks through the ice, the rest is buried in three kilometre thick ice where that picture was taken. I easily climbed to the top of that, ticked off a three thousand, three hundred metre high peak, but just didn't tell anyone that I got the first three free. That shot was taken about six hundred and fifty kilometres from the pole and there were lots more mountains between that shot and the pole itself. It's just that none of them were actually physically big enough to poke through the ice, so you are skiing right over the summits of the mountains.

What sort of things have we been experiencing recently? We had those icebergs off New Zealand recently, they were part of a massive berg that we encountered on a trip to Antarctica, I was there from December last year to April of this year. We had to steer around this berg, it was eighty kilometres long by about fifteen wide, a massive iceberg. Not as big as the Larsen B ice shelf which is a bit that

broke off some years ago the size of Belgium I think it was, a massive, massive amount of ice. Really whether or not we get icebergs further north depends on the direction of the winds and the currents and things like that. I mean there are always icebergs carving off, it is a question of where they end up and on this particular occasion, some icebergs actually escape the southern weather pattern and made it up to New Zealand. Certainly, they're so vast that they could do several journeys around the world without melting. It is a case of whether the wind and the currents carry them north. This one here is a very small one, this is about two and a half kilometres by - we flew in by chopper and landed on a relatively flat section in here.

What was I trying to do? I went there in 99 with the plan to try and cross the whole thing on foot. We started at a point out here this is near where Shackleton's boat went down in his famous journey and this area is called the Weddell Sea around here. Shackleton of course with the boat having sunk, he and all his twenty-eight men went back to a place called Elephant Island and then set off on a twelve hundred kilometre journey on an open rowing boat, essentially across the open ocean to reach a whaling station and raise the alarm and save all the men. Ironically, of course about half of them died in the first world war which was raging at the time the following year when they got back from that. It is like out of the frying pan into the fire.

Anyway we wanted to start our journey over on this side here and traverse this little blue line here, that's not really well marked I'm afraid but this blue area here is the edge of what is known as the Ronne ice shelf. And this area here is a large bay about the size of Victoria probably, that rises and falls with the tide, it's about a kilometre thick on the landward side and maybe a hundred metres thick on the seaward side. So it's a huge volume of ice moving up and down the tide on a daily basis, which means you've got crevasses all the way around the edges where the ice rubs up against the solid rock of the continent.

Our plan was basically to start here, trek across this, which is about a three hundred kilometre wide stretch up through the mountains, through this stuff here called sastrugi, which is a sort of a windblown surface of ice and some of it two or three metres high, very torturous kind of surface and up to the pole. Now unlike the north, which is just basically a position in the ocean and if you are lucky enough there will be ice there the day you get there. Down south, the South Pole is three thousand metres high and there is a functioning US scientific facility there. Scientists live in a kind of strange subterranean world underneath the sort of geodesic dome, silver dome and you kind of go down underneath and within the dome is a kind of space age little city in there. People live in shipping containers, which are like an inverse of a refrigeration unit in that they're warm inside and of course the outside temperature is sub zero.

It is a fascinating place and the plan was to get up to there and from there traverse down through the mountains again down onto the Rossi shelf, which is the biggest ice shelf of them all. This is where Scott and his men died tragically only thirteen miles from there, their final food depot back in the early part of the twentieth century. They physically weren't able to lift themselves to go another thirteen miles to save themselves. It equated to only three hundred metres or so a day, a distance they weren't covering from the point of which Scott realised things were going pear shaped and they weren't going to make it. He wrote in his diary, if we could just cover a bit more we'd make it, but at the rate we are going I just don't think and of course accumulation of those three hundred metres and they fell thirteen miles short and all died. And to get to there and then go to McMurdo, which is the joint American, New Zealand base on the far side. It has the unfortunate distinction of being the most polluted harbour in United States territory given the amount of hydrocarbons and heavy metals that have been dumped there over the years since 1957 I think when it was established. Too difficult, too costly to remediate, too much danger in the process of trying to dig all the stuff out and physically remove it and actually disturbing it and actually causing problems so they've left it.

Unsupported checking in these places involves basically pulling a sled. As I say the one up north was much deeper than this, designed to be able to sit on with all of my food in the back and actually float if the ice opened up. This one was just built for lightness; you don't have that problem down south of course. We carried about two hundred and twenty kilos of food, fuel and equipment for the total crossing, which is two thousand and seven hundred kilometre journey and we bargained on ninety-three days, we had ninety days at thirty kilometres a day and three days of free board in there, just in case, that was the plan. And you pull it pretty much like a pack horse pulls a cart. This is Peter, you can probably tell. It got a bit like that, you needed that to remind yourself sometimes.

This sort of snotty thing here is precisely that, a combination of breath and snot and all that kind of stuff, it comes out as you are going along in minus thirty degrees. Any moisture in your breath, freezes and remains moist until the point in comes into contact with your balaclava and it then starts dripping and soon as it starts to drip it just freezes and then you get an extended sort of stalactite type arrangement going on. These would get quite impressive and quite long, you know some days you'd just see who could grow the biggest one and that kind of thing, it's the sort of stuff you do. It is pretty bitter, pretty unpleasant

How do you do these trips? I think you've got to obviously spend a lot of time planning them, in all seriousness you approach the how at a whole series of levels, philosophically why do you want to do it, how do you get the time off, how do you plan these things, how do you raise the money, because they're expensive exercises, I'm not going to go into all that now. But they are major, major exercises and of course you've got to have the correct level of physical fitness and mental fitness for knowing that you are going to break down the enormity of the task that you've got. Not much snow in South Australia, so I used to pull this ridiculous tyre around by way of training for pulling the sled. I used to pull it down one of the metropolitan beaches and I used to get stopped by people every five minutes saying, what the hell are you doing pulling that tyre down the beach. So I had to take my tyre and go to the outback and start pulling it around up there, which is a ridiculous exercise really but very good for training.

We got dropped off – a lot of the costs associated with mounting one of these trips involved the logistics as I say, you've got to find someone who is prepared to fly you and drop you at this GPS reference on the edge of the Weddell Sea which you've just sort of made up yourself. Through satellite photography and things like that we had decided on a particular spot. Found out what the GPS coordinates of that were and we paid a couple of Canadian pilots several thousand dollars to fly all the way down from Canada, bunny hop across from the southern tip of South America to the Antarctic and go back taking some fuel, fly back again, bring more fuel and then take us to the start of the trip. Then fly back to South America and wait for us to call on a satellite phone, simple but it took a lot of organising.

This was home for ninety-three days. This is Peter again without the nametag but again you can see the amount of ice that builds up, you've really got to keep everything covered. I appreciate I'm talking about global warming here and of course it's incredibly cold, but global warming manifests itself with a lot of movement of the ice from the edges of the continent and I'll talk about that very briefly in a second. But exceptionally cold, exceptionally cold. The Canadians have a rule, called the thirty-thirty rule, which is in thirty miles an hour of wind in minus thirty degrees, skin freezes in thirty seconds, so you've got to keep absolutely everything covered all the time.

This is Peter about a month in with all the frostbite damage you can see around the face and things like that. Life in the tent was an interesting experience with one other bloke for an extended period like that and I won't go into that now. This is the principle food source, this is a kind of a muesli, nut, multi-vitamin mix with some raisins and stuff like that and some powdered milk, together with olive oil. Olive oil was the principle fat source so we would eat about four hundred mills of olive oil a day just to

keep the fat levels up. It gave us about seven thousand two hundred calories a day and during the course of this we lost, I lost eighteen kilos, so it's a great place for weight loss if that's your, yeah. It is perhaps the most revolting thing you can ever eat and another aspect of the planning; you eat this in advance of going. So sitting in Adelaide I'd be eating my cornflakes with olive oil on just to become accustomed to it, you can't afford to get there and find you have stomach problems with digesting olive oil from nothing to suddenly it forming a staple in your diet, so very interesting.

Breaks would be for just five or six minutes, any longer than that from going from a state of being completely hot from working hard to being frozen to the extent that your blood was just out of your fingers and completely numb, deep tissue numbness, not just a little bit of numbness in the fingertips, it would take less than ten minutes in those conditions, so you've got to get up and keep moving again.

The thermoses were really just to keep the contents liquid, not to keep them hot, so water would just be kept liquid by keeping them in the thermos. The effect that all this has of course is massive weight loss, a lot of frostbite injury. I've still got quite a few appendages, which seem to be permanently numb, various toes, the thumb on the right hand and that sort of thing. I lost teeth down there, I was walking along one day and realised that there was something loose in my mouth and it was in fact a molar from the back of my mouth and the filling had contracted in the extreme cold and just dropped out, I lost three teeth in that fashion. I had a dental kit with me so I was able to administer some repairs during the course of the trip and after doing the first one it was so painful that I decided to just leave the other two as they were. I got back to Australia and the dentist said, who the hell did this work. It is just one of the many things that get thrown at you when you are down there. The enormity of the place, as I said it is absolutely vast.

From an environmental point of view, it is fascinating because it is really the product of a climate, which no longer exists there. It is the driest continent in the world by a long way and when we talk about Australia being dry, we had thirty-seven days I think it was with no rain in Adelaide about five or six years ago, people were getting the record books out. Some places there have had no precipitation for two hundred and fifty thousand years, really incredibly just altogether a different order of magnitude. The ice cap is really a historic feature, it is not being constantly replenished by fresh precipitation. A lot of the blizzards that Mawson talked about were the same old snow being blown around, not fresh snowfall. Some areas of course there is snowfall occurring but there is a lot of areas which are incredibly dry and you've got to come to terms with that. You've got to come to terms with the enormity of the place and often it was a very, very solitary exercise trekking along there. I'd be there, I was there with a partner but often we were travelling great distances apart at a speed that we felt comfortable with and you have to have all sorts of mind games to occupy yourself and keep yourself going. Of course, the moods are ebbing and flowing all the time and you've got to have techniques for managing those.

Crevasses, obviously are a major issue. When you've got – it is a no brainer really when you've got such a vast thickness of ice, a crevasse can be incredibly big. This is a shot taken from a kind of a moving camera, which is why it is a little bit distorted, it is not a super imposed picture of people. If you've got two kilometres thick of ice and ten percent of that thickness is already a two hundred metre hole, so if you fall in one of those you are really not going to come out.

This is the sastrugi I was talking about, an amazing feature, and we had five hundred kilometres of that pretty much in a row. With not an area, the size of a tennis court that was flat and you have to pull your sled in and amongst all this.

How do you cope? The Dalai Lama, I think I always say this, but the Dalai Lama says there are two types of problems, there's the ones that you can overcome in which case don't worry and there are the

ones you can't and in which case don't worry. I think you sort of have to have that sort of mind set for doing this sort of stuff.

The pole as I say is three thousand metres high and it has a scientific base there and this is what Mark said, it is actually a mirror ball, which is a bit strange and so you walk up and logically enough you take a picture into it and you get a kind of distorted picture of yourself in that mirror ball. Of course, it was designed originally for taking pictures of the night sky, the aurora, before they developed fish eye lens technology they took a photograph with a conventional camera into a reflective sphere and they got a kind of reflective image of the night sky. It is quite a clever way of doing it.

It was interesting because as we approached the pole, after forty-seven days I saw some figures, we hadn't seen anything at all, no evidence of humanity whatsoever, no vapour trails in the sky or litter or aircraft or anything else and to see the buildings at the base as you come up on day forty-seven was an amazing experience, to put it mildly. I saw a person moving around in the distance as we approached the base and scientists there are wearing very, very thick layers of clothing to protect themselves against the cold. We dressed very, very thin, but they wore very thick clothes and we almost crept up on this guy and he looked around and saw us coming and next thing we had five or six of him and his colleagues coming towards us all head to toe in all these visors and things and there was no skin showing and the heart was really going as these two groups of people approached one another it was really quite an amazing experience.

Anyway we only spent five minutes at the pole and we headed off towards the other side. I don't propose to talk about that now, but I've put this in because these tracks mark the tracks marked by a vehicle that leave the pole and go out and measure atmospheric air quality at a point sort of five and a half six kilometres away from the pole itself. The news is not good obviously, the news as I say really relates to the levels of carbon that are in the atmosphere as a result of largely to my knowledge anyway our activities. If you breakdown the fundamentals of the argument, I mean greenhouse gases are something which naturally occur, they are caused by gases like carbon dioxide and methane, they do insulate the earth, that's why we are here and life exists on this planet. You justify that with the fact that we are churning out a tremendous amount of stuff into the atmosphere of that there is no doubt, we have got the highest levels in six hundred and fifty thousand years by some people's estimates and twenty million in other people's estimates. I don't think there are any incidents that those correspond to the same two hundred year period that we've actually been burning fossil fuels. Quite frankly I think we make very fundamental judgements about many of the aspects about the way we run our lives based on much less information and much less certainty than that with which we are presented with this sort of information. I think the evidence is really there that we are causing a major impact.

I thought I would just finish with a few myths that I keep hearing and the first one is one that I've just sort of largely founded on the fact that this seems to be this fundamental issue with believing whether or not we're causing a major contribution to the current levels of temperature rise that we are experiencing. I just find it a little bit difficult personally to understand how people can really with any degree of conviction argue the counter argument.

This is Davis base where I had the good fortune to spend five weeks in. This used to have quite a bit of snow around but of course now the cap is back about ten kilometres from the base so it never changes it is always this lunar landscape. I lasted five weeks at this base after my latest expedition that finished in April.

Another thing I hear is okay temperatures are rising, but that results in more evaporation from the sea and more snow fall and therefore the caps growing at the same rate at which it is losing ice at the edges. Not really, we haven't experienced for many of – there are almost a hundred bases in the Antarctic the vast majority are on the coast but the Russians and the Americans and the Italians have bases inland and

there is some automatic weather stations too. We haven't really recorded any significant increase in the amount of snow fall that's occurring in the Antarctic from any of these locations. What we have experienced is a massive increase in the speed in which carving is happening off the side. I've actually pinched this diagram because I quite liked it. Essentially because we are getting a lot more melt through warmer temperatures at the heads of a lot of the glaciers and Antarctica is shaped like an upturned soup bowl so the ice basically goes from the middle towards the edges. There are a few variations on that, but that is essentially what is happening. Because we are experiencing greater melting further up you get a lot more melt water that is going through the base of the glacier and it just lubricates the ice at the base of the glacier and you are actually getting an increase in the speed of the glaciers. There are fifty or sixty major glaciers in Antarctica, which are being monitored in this fashion using the same kind of technology that is used to monitor tectonic plate movement, so absolutely * amounts of movement can be recorded. We are talking metres here rather than millimetres, which are used for the tectonic plate measurements. We are quite simply seeing a greater amount of carving of ice into the ocean due to two things; one increased temperatures is only by a fraction further up where you are getting the accumulation of the ice and a reduced incident of sea ice around the edges here and the effect that sea ice has is to actually hold up the glaciers. Once the sea ice is moved the glaciers can carve that much more quickly. Now these aren't my figures but of the sixty glaciers being observed currently, they are experiencing about ten percent more carving than they had in the past, so we are getting a lot more ice flow occurring from these major glaciers. As I say the scale of some of these things are quite vast. If you take the Lambert it's a hundred kilometres across and there is a project there called the lose tooth project which is looking at the ice shelf into which the Lambert flows, it's called the Amery ice shelf, it's the third biggest in the Antarctic. A vast area and there is a huge section about two hundred by fifty kilometres in size which is threatening to break off and they're measuring the extent to which that crack is increasing and that they believe is largely due to the effects of a small increase in temperature.

Another one I hear is – this was taken in Chile this shot. I climb as often as I can when not doing the pole trips but this is about six thousand metres high this volcano, quite spectacular. I hear a lot of talk about the amounts of greenhouse gases we are putting into the atmosphere being negligible compared to natural sources and the new scientist recorded recently, if people read that journal, it is a pretty respected trade journal, that emissions from humans sources account for a far large proportion of the carbon gains, the atmosphere, it's something like I think volcanic eruptions account for about eight percent of human contributions in terms of greenhouse gases into the atmosphere each year. So again not a tremendous amount of credence in that argument.

This is a largely unsuccessful attempt at a little dissolve where the map of Australia is dissolved to show you what would happen if we had a ninety metre global sea level rise and for some reason doesn't seem to be working but rest assured the majority of the cities end up in the ocean effectively. If you had a total melting of the cap, a lot of people say well that's not going to happen, and that may well not happen, but I can tell you this, certainly a lot of engineering projects like marina developments and things like that, only build in a small amount of free board into their calculations. Glenelg marina, which is the largest South Australian development only built in twenty centimetres of free board, that's not very much in the context of the kind of sea level rise you can see over a period of decades.

What can we do? Well this is a shot of us coming back from our South Pole trip, thrust into the lime light in front of the media and that kind of thing, all complete with beards and being asked about what next and at that stage we hadn't done the north so we said, well we'll go north and a fascinating journey to have undertaken.

What can we do about it? Well I mean, from someone who works a lot in the environmental management system side of things, I've noticed there seems to be a – there is the mainstream business that gets operated and then there is environmental thinking that is the sort of a bolt on at the end. I

sometimes wonder whether the environmental management aspect of the way businesses get run, shouldn't be just integrated into the way businesses get run. I think it's probably the worst thing for it to have it sitting out to the side because people perceive it to be a cost, they perceive to regard it as something that is not going to contribute to the bottom line. Whereas I feel there are great opportunities in there, like waste minimisation and energy optimisation to look at environmental issues. Often there is a bottom line reward to be had from looking at those things. I did a lot of work with Holden's and they had exactly the same issue, they had an environmental management system here and then they had making cars. And as soon as they got rid of their EMS and actually incorporated that thinking into the way that they looked at optimising their performance they started seeing quite a significant improvement in performance. It is just when it sat out in the environmental area at the side there that people were put off by it.

I think I'm going to finish there because I think I've used up my time. Thanks very much for your time.

End of transcript

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