

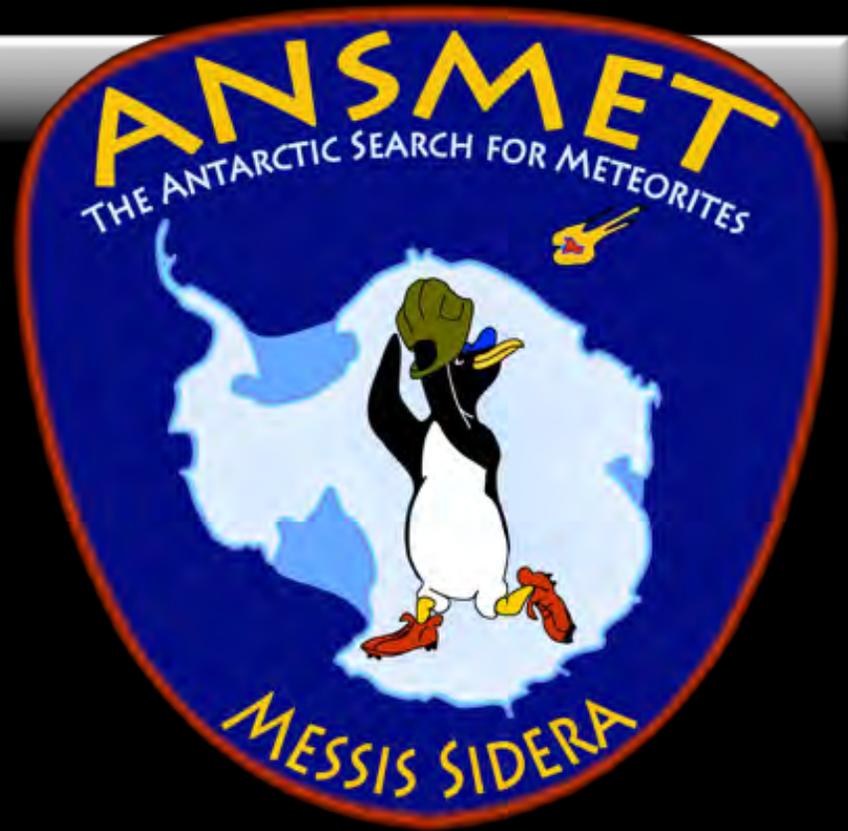
# The Antarctic Search for Meteorites



# What is ANSMET?



Smithsonian

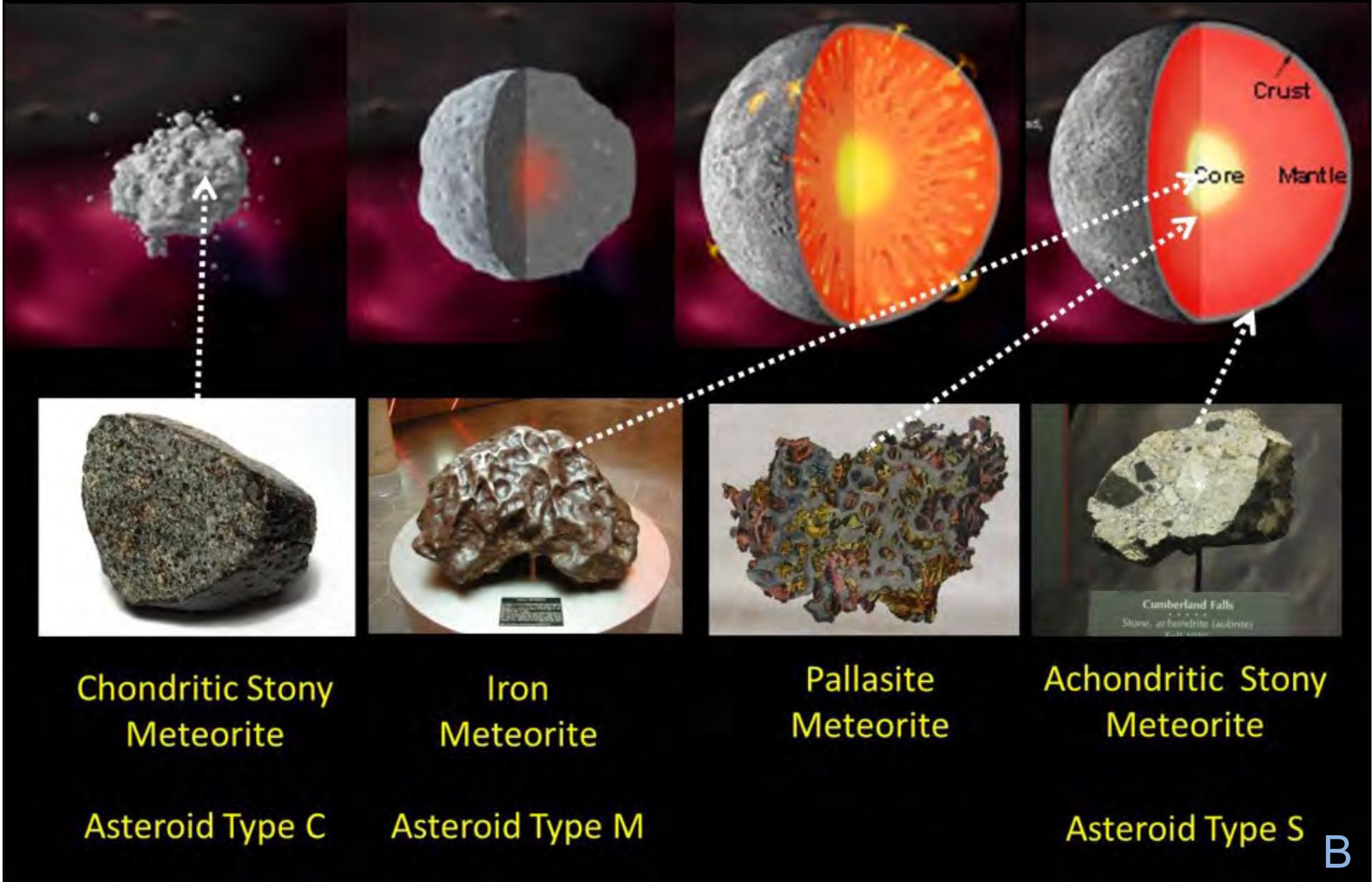


**1969:** Japanese explorers find 5 different kinds of meteorites on blue ice near Yamato Mountains

**1976:** Bill Cassidy gets NSF support for meteorite expedition within reach of the U.S. base at McMurdo

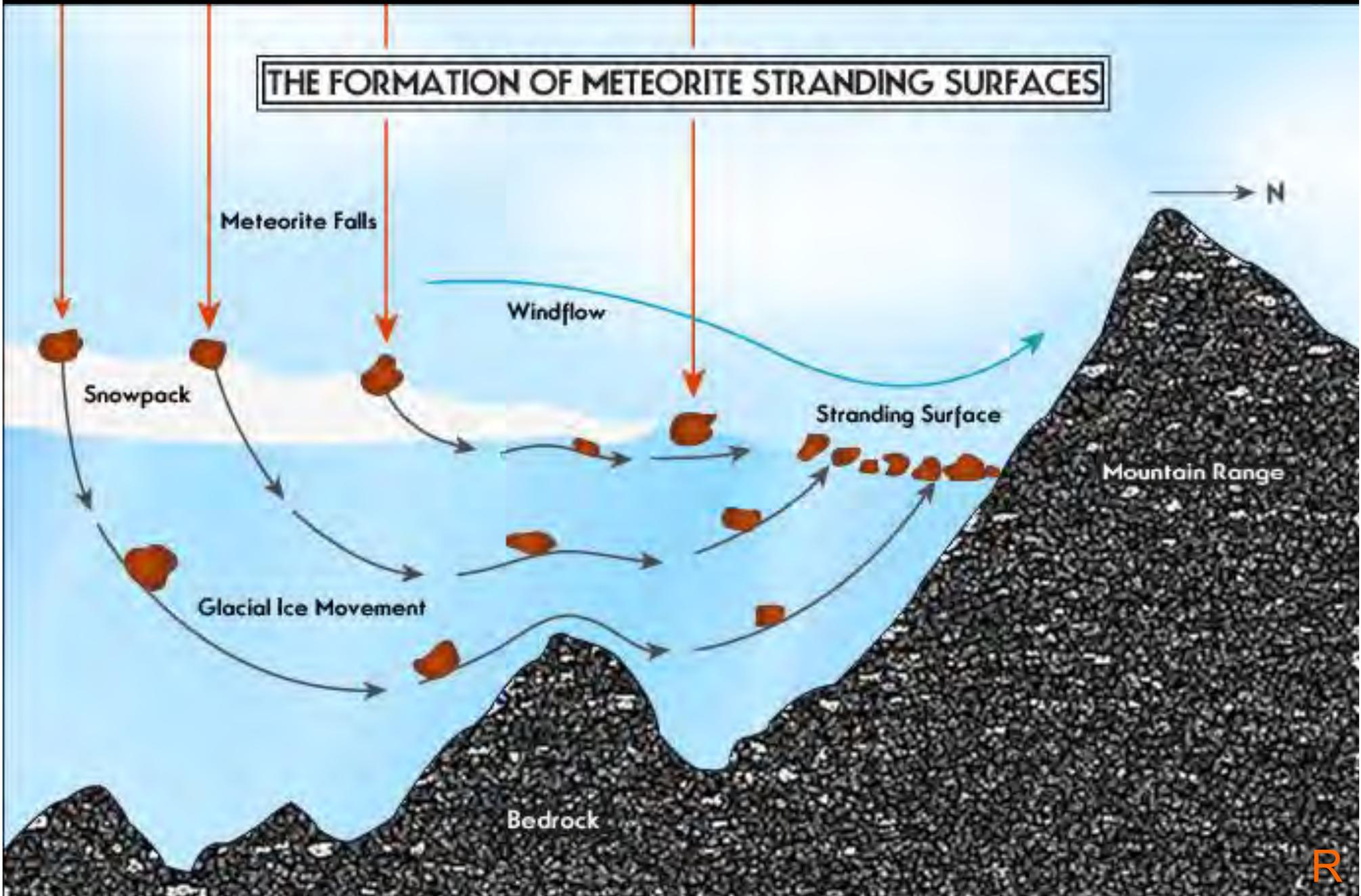
85% of the world collection is Antarctic  
ANSMET has recovered >25,000 meteorites

# Where do meteorites come from?



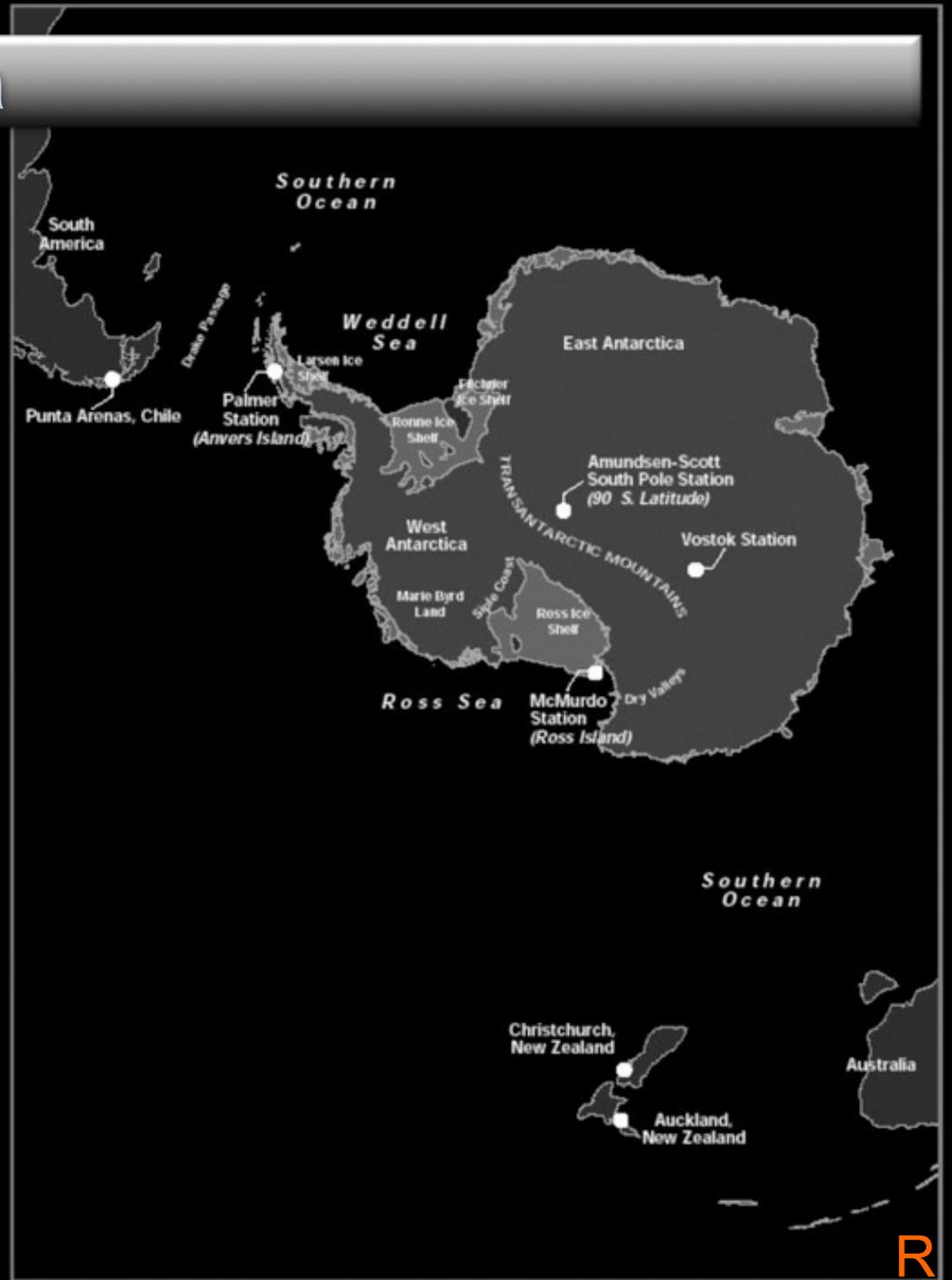
# Why Antarctica ?

## THE FORMATION OF METEORITE STRANDING SURFACES

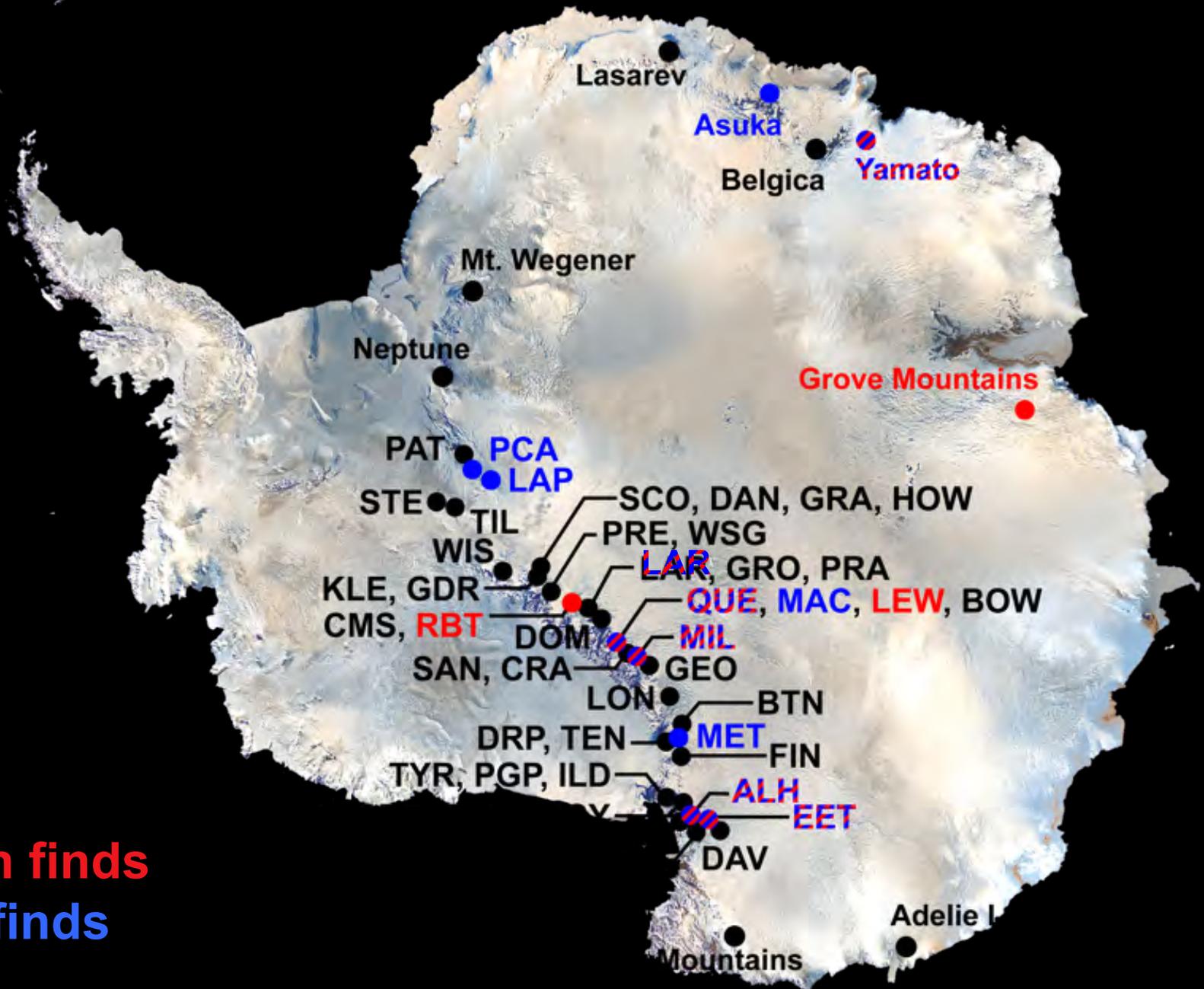


# The U.S. in Antarctica

- Permanent US Bases at Palmer Station, McMurdo Station, South Pole Station
- 2 research vessels
- ~10 seasonal outposts
- Many field camps



# Meteorite stranding surfaces



**Martian finds**

**Lunar finds**

HSV-ORD-LAX-SYD-CHC



# Clothing distribution center



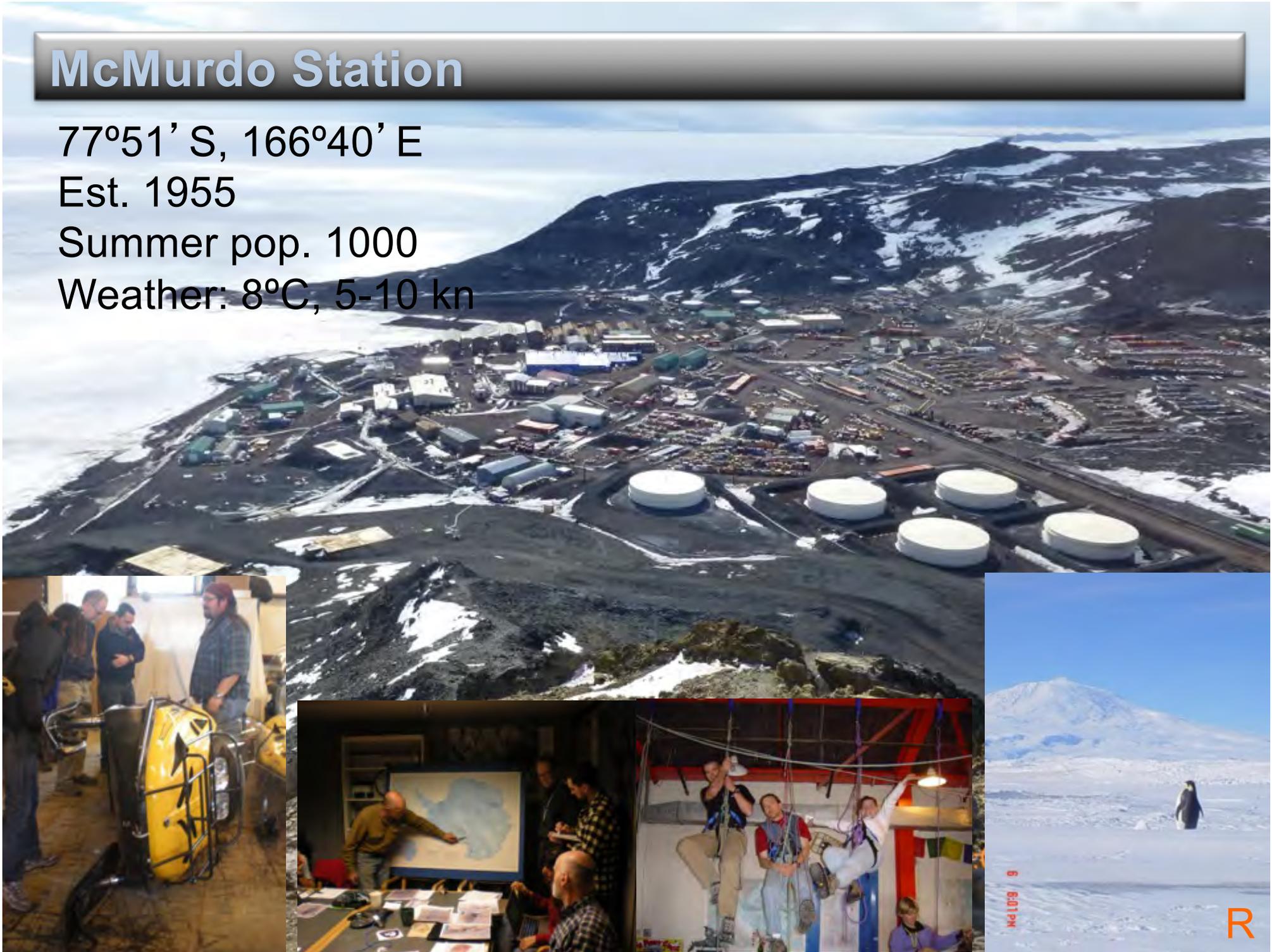
# McMurdo Station

77°51' S, 166°40' E

Est. 1955

Summer pop. 1000

Weather: 8°C, 5-10 kn



McMurdo

R

# South Pole station

Est. 1956, dome 1975, elevated station 2006

Elevation 9400'

Summer pop. 220

Weather: -28C, 10 kn; (-37C windchill)



# Transportation



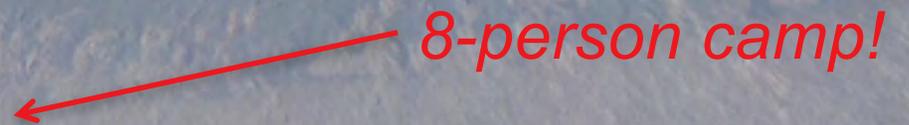
# Field Sites

85-88° S 140° -156° W

Elevation 7500' -9000'

Weather: -5° F, 40 mph = -45° F  
windchill (frostbite in 15 mins)

*8-person camp!*



# Blue ice surface



# Big ice searching



Humans are the most efficient instruments for finding meteorites

Human eye can resolve dark, cm-sized meteorite at 100 m

Human brain can distinguish meteorites from terrestrial rocks

# Moraine searching



1



1



2



R

2



R

3



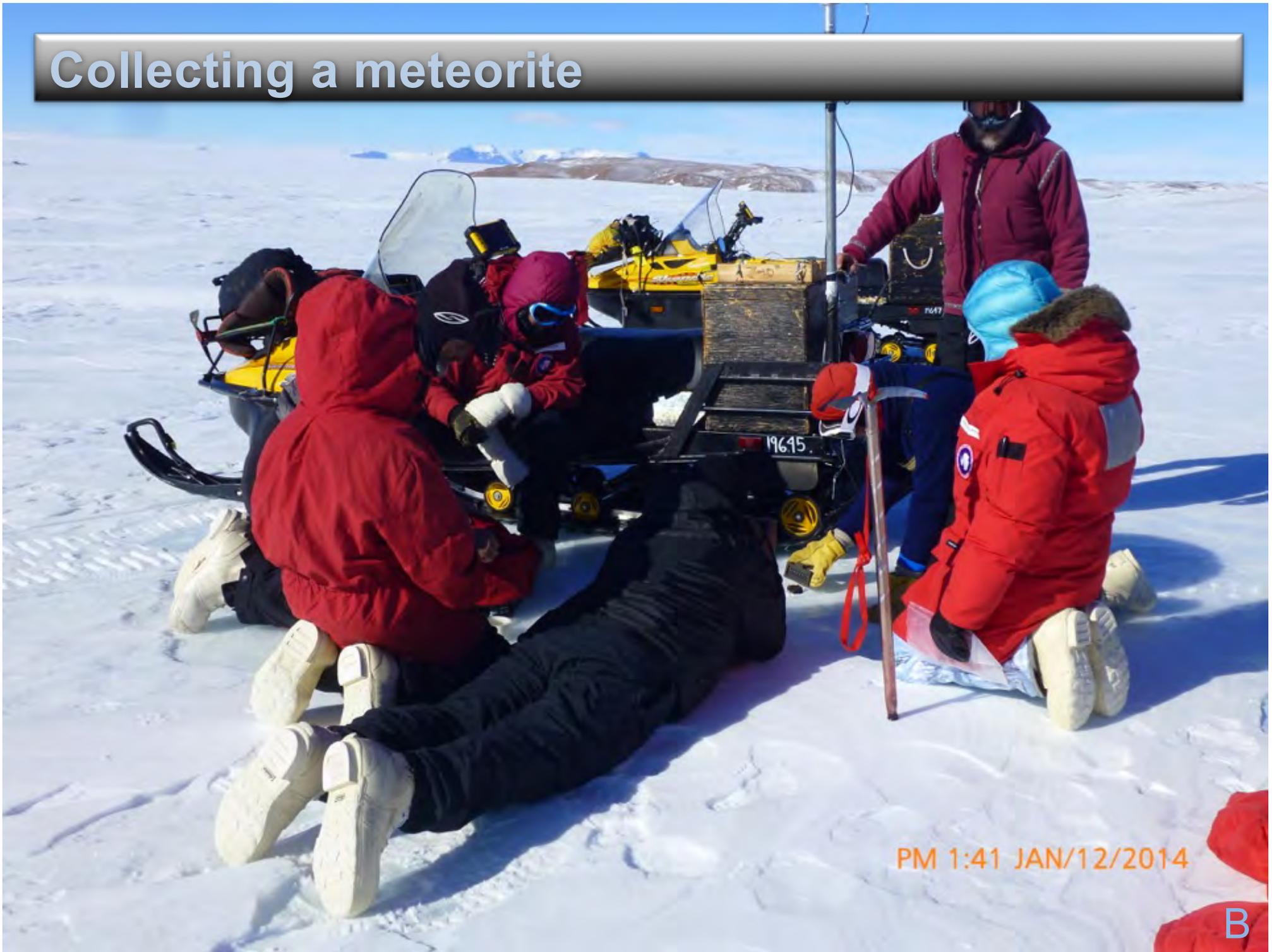
3



# A forest of flags



# Collecting a meteorite



PM 1:41 JAN/12/2014



**Ordinary  
Chondrite  
50% fusion crust**



**Carbonaceous  
Chondrite  
50% fusion crust**



**Iron meteorite  
20% fusion crust**



## Lunar Basalt

**LAP 03632**

From a lava flow on the  
Moon



**Achondrite**  
**100% fusion crust**  
**Possibly lunar**

12.18.2003 09:51

# What happens to the meteorites?

**ANSMET** expeditions collect meteorites  
Meteorites packaged, tagged, noted

Meteorites kept frozen, shipped  
by boat to CA, truck to TX

**Johnson Space Center**

Unpacks, processes,  
classifies, curates

**Smithsonian Institution**

Classifies meteorites,  
long term storage

Antarctic Meteorite Newsletter published 2x/yr

**Researchers** worldwide request samples

**Meteorite Working Group**

reviews research requests

## Antarctic meteorites are...

- The most pristine collection in the world
- The most accessible collection in the world - loaned to researchers in many countries
- The most diverse collection in the world - many samples of every type



- An important source of planetary samples, particularly from Moon and Mars

**“If you’ve done ANSMET, you’ve done long duration space flight.”**

**~ Don Pettit, ANSMET veteran and three-time Space Shuttle and International Space Station crew member.**

**harsh, isolated, dangerous,  
small quarters, limited  
communication**



# Camping on the ice

Solar panels

Double-walled canvas tents

Radio antenna

Food and supplies

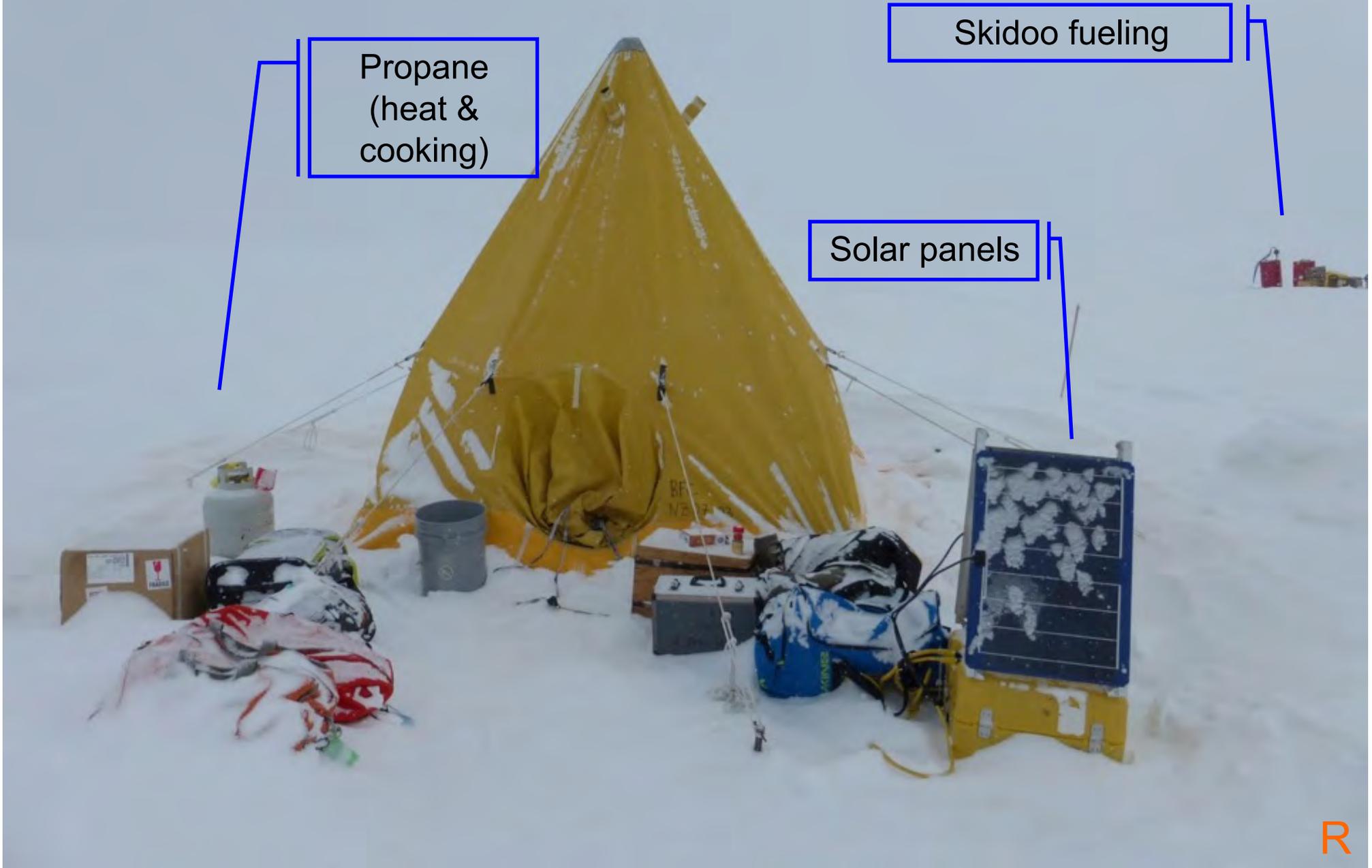
GPS basestation

# Base camp

Propane  
(heat &  
cooking)

Skidoo fueling

Solar panels



# Base camp

Poo tent

Science tent

# What we eat

**Breakfast:** oatmeal, bagels/english muffins fried in butter, BACON

**Lunch:** sandwiches, instant soup

**Snacks:** trail mix, jerky, granola bars, lots of chocolate

**Dinner:** steak, fish, frozen vegetables, tofu, boxed pasta & rice mixes, curry, stirfry

**Drinks:** hot chocolate, tea, juice boxes, Raro (NZ Koolaid)

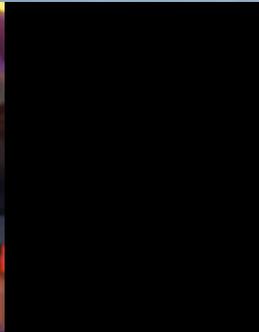
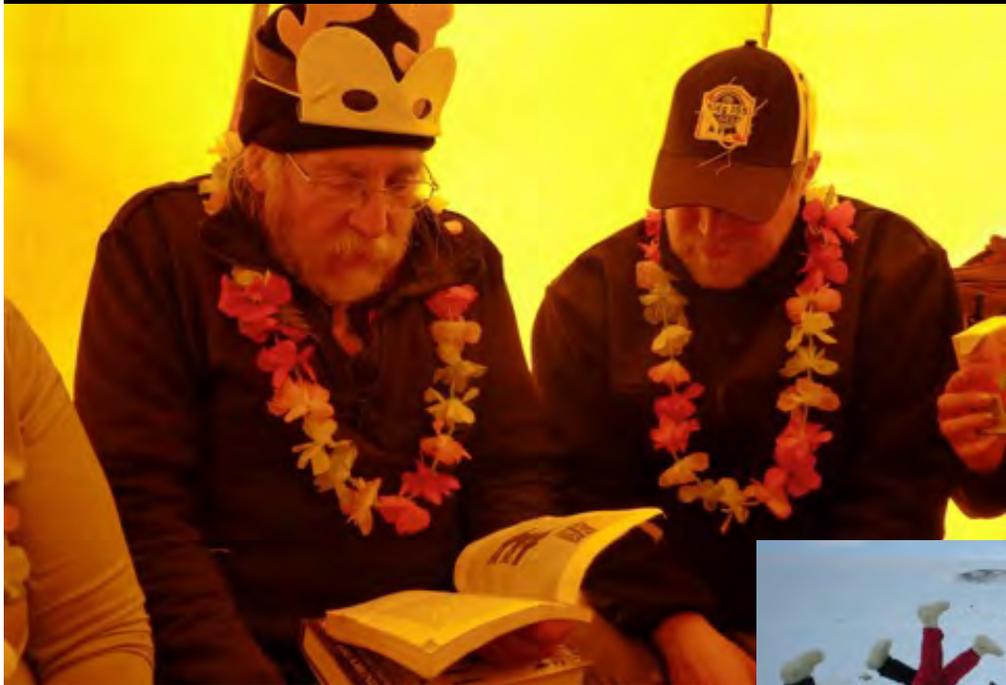
melt our own water!



# Waste management



# Living in tents



# What we wear

Underwear

T-shirt

Silk long underwear



22 12:46PM

B

# What we wear

Underwear

T-shirt

Silk long underwear

**Polypro liner socks**

**Capilene thermal top**



# What we wear

Underwear

T-shirt

Silk long underwear

Polypro liner socks

Capilene thermal top

**Heavyweight bottoms**

**Fleece turtleneck**

**Fleece balaclava**

**Wool socks**



# What we wear

Underwear

T-shirt

Silk long underwear

Polypro liner socks

Capilene thermal top

Heavyweight bottoms

Fleece turtleneck

Fleece balaclava

Wool socks

**Windproof bib pants**

**Fleece neck gaiter**

**Polypro liner gloves**

**Rubber bunny boots**

**Wrist brace**



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Windproof bib pants

Fleece neck gaiter

Polypro liner gloves

Rubber bunny boots

Wrist brace

**Outer mittens**

**Windstopper balaclava**

**UV ski goggles**

**Down parka**



# Dangers

**Fire**



**Storms**



**Crevasses**

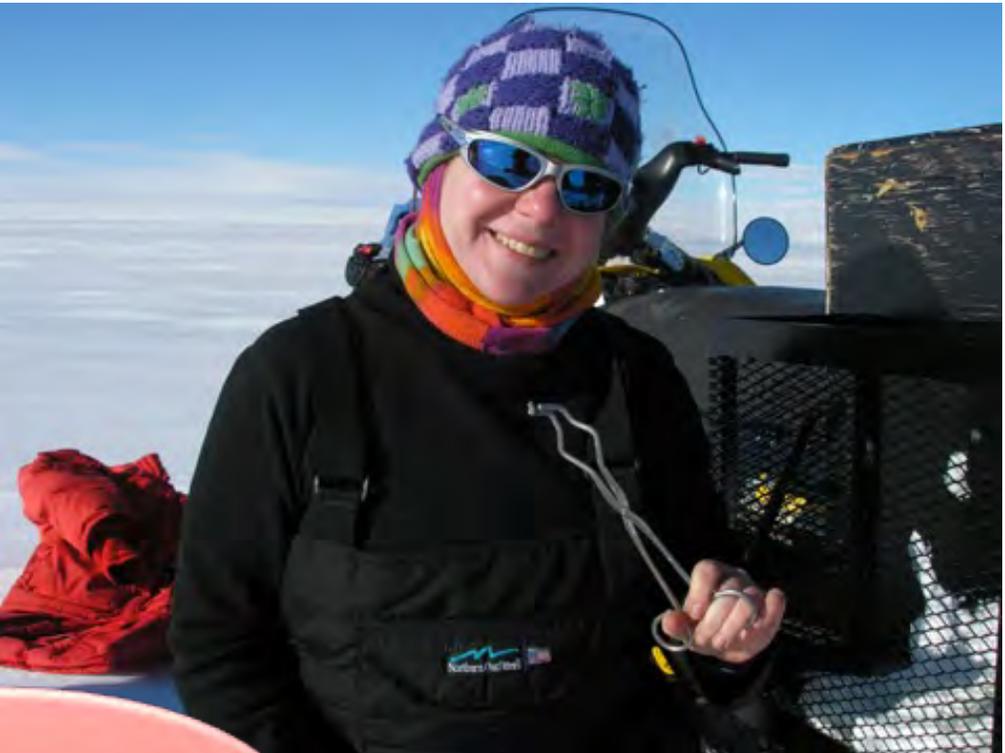




## Antarctica: It's a Harsh Continent

Scott:  
“this is an awful place!”

Cherry-Garrard:  
“it beggars the language”



Thank you!

