

GEOHAZARDS IN AZORES AND MARITIME ANTARCTICA

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SiDRR, May 11-12, 2019

In this presentation we will talk about:

1. About geohazards in mid-latitudes - the Azores Archipelago.
2. About geohazards at high-latitudes related to climate change - the Peruvian Antarctic Station Machu Picchu.

What does the Azores
Archipelago have in common with
the Antarctica and, in particular,
with the Peruvian Antarctic
Station of Machu Picchu?

In both regions geohazards occur and what happens in one site has consequences in the other.

As a matter of fact, what is happening in Antarctica will have a profound impact in the Globe.

Geohazard definition:

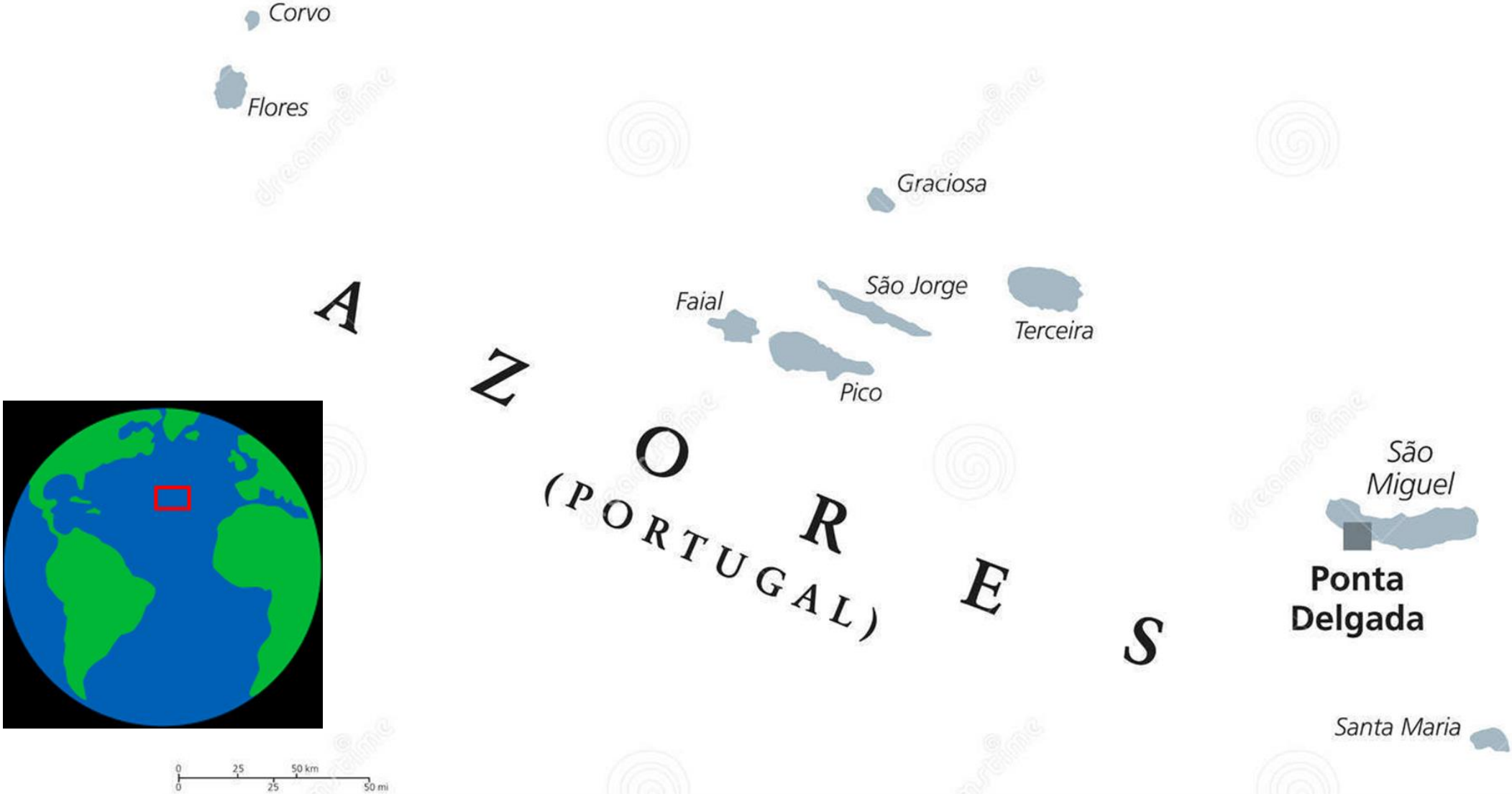
“Is a geomorphological, geological, or environmental process, phenomenon and condition that is potentially dangerous or pose a level of threat to human life, health, and property, or to the environment.”

In: *Encyclopedia of natural hazards*

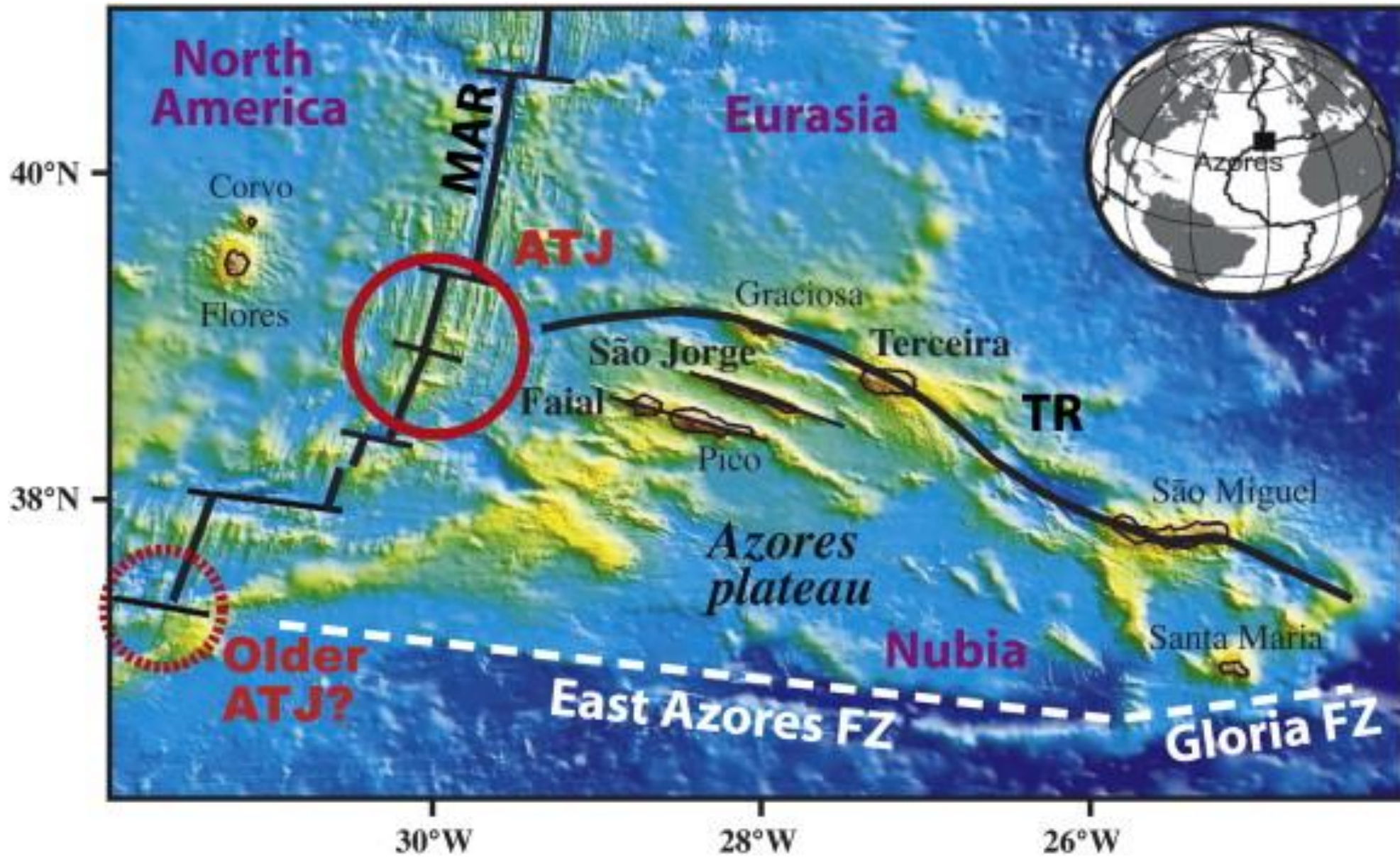
Climate change as a geohazard

1. Climate change is associated with hazards that have the potential to impact directly on human activity.
2. They include floods and droughts (caused by changes in precipitation).
3. They include heat waves and cold snaps (caused by changes in temperature).
4. They include hurricanes, tornados, and typhoons (caused by changes in wind speeds).
5. Indirectly they can include earthquakes, tsunamis and other land processes.

The Azores Archipelago



The triple junction of Azores



The Azores Archipelago

Since the XV century, when the first settlers arrived to the islands, several natural catastrophes occurred and were responsible for thousands of deaths and severe damages with high economic impact.

In 1997 the Azores University created a research unit - the Research Institute for Volcanology and Risk Assessment (IVAR) – to study geohazards in the archipelago.

The IVAR

The activities of the Research Institute for Volcanology and Risk Assessment (IVAR) are multidisciplinary and have as objectives the prevention and forecast of natural hazards.

IVAR's mission is to promote and improve science and technology in the area of volcanology and related domains, in order to understand volcanic phenomena in the region and assess the risk directly or indirectly associated with them which includes volcanic eruptions, earthquakes, vapour explosions, toxic gases emission, landslides, floods and tsunamis.

IVAR's objectives

To promote basic and applied research in the domains of
Volcanology and Risks Assessment;

To perform experimental development;

To design, develop, implement and manage systems for the
monitoring of natural phenomena;

To support decision making in the field of Civil Protection;

IVAR's objectives (cont.)

To promote the conservation and protection of geological and volcanic landscapes;

To encourage scientific cooperation with national and international institutions, public or private;

To promote and ensure the qualification of human resources through education and professional training of high level;

To promote the diffusion of scientific research results at national and international levels.

IVAR's organization

Governance

Logistics and Support

Several Scientific Research Lines

INFRASTRUCTURES: Laboratories; Monitoring Networks;
Data Management Facilities

An example from Azores

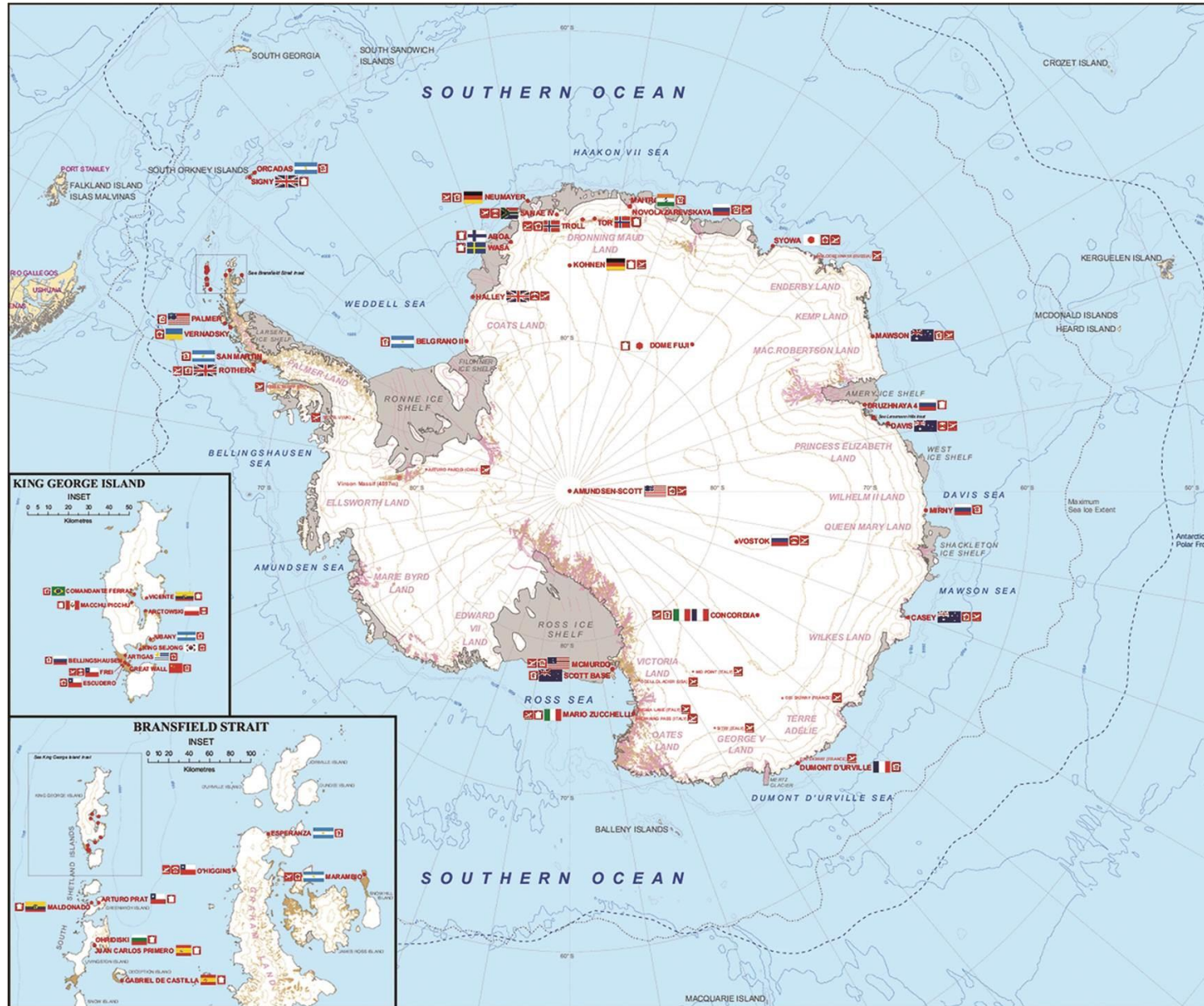
Volcanic islands are often nice and fertile regions visited by many tourists. But they are vulnerable and populated.

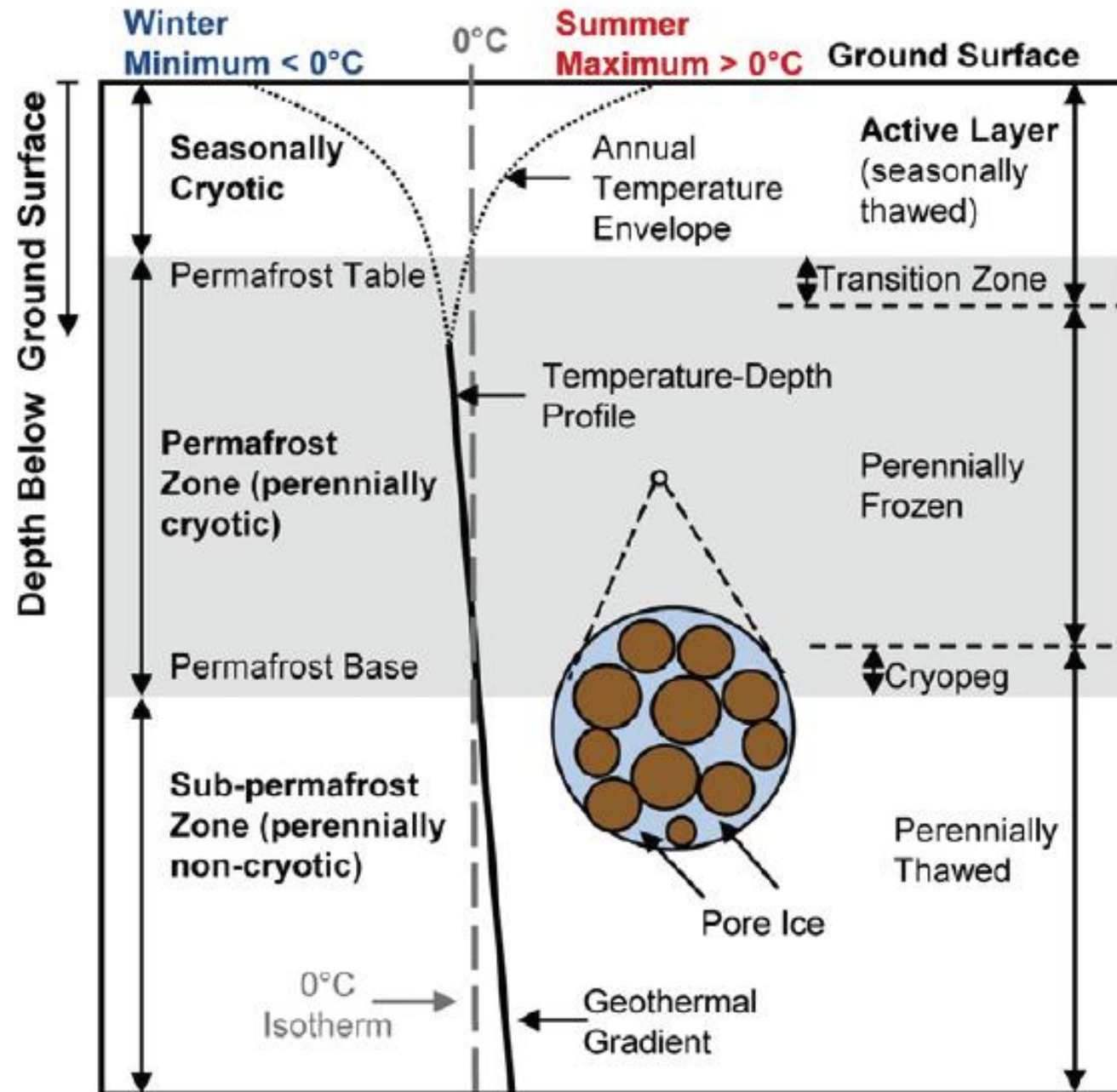
An IVAR study explored the relationship between the perceived living place benefits and the volcanic risk perception of 530 residents in the Azores.

Participants perceived volcanic risk as moderate. Results point to risk devaluation.

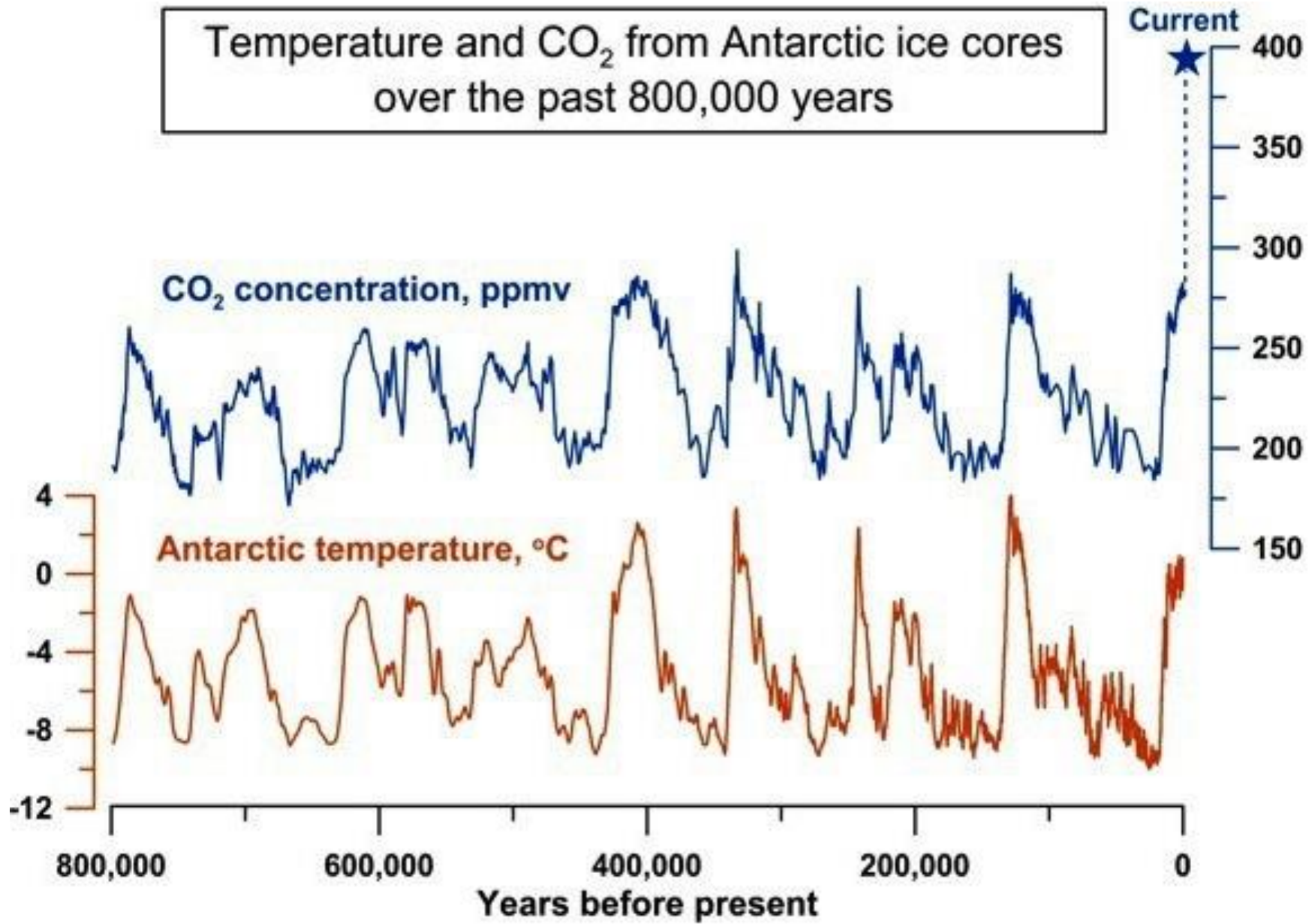
There is a need for volcanic educational efforts in the Azores.

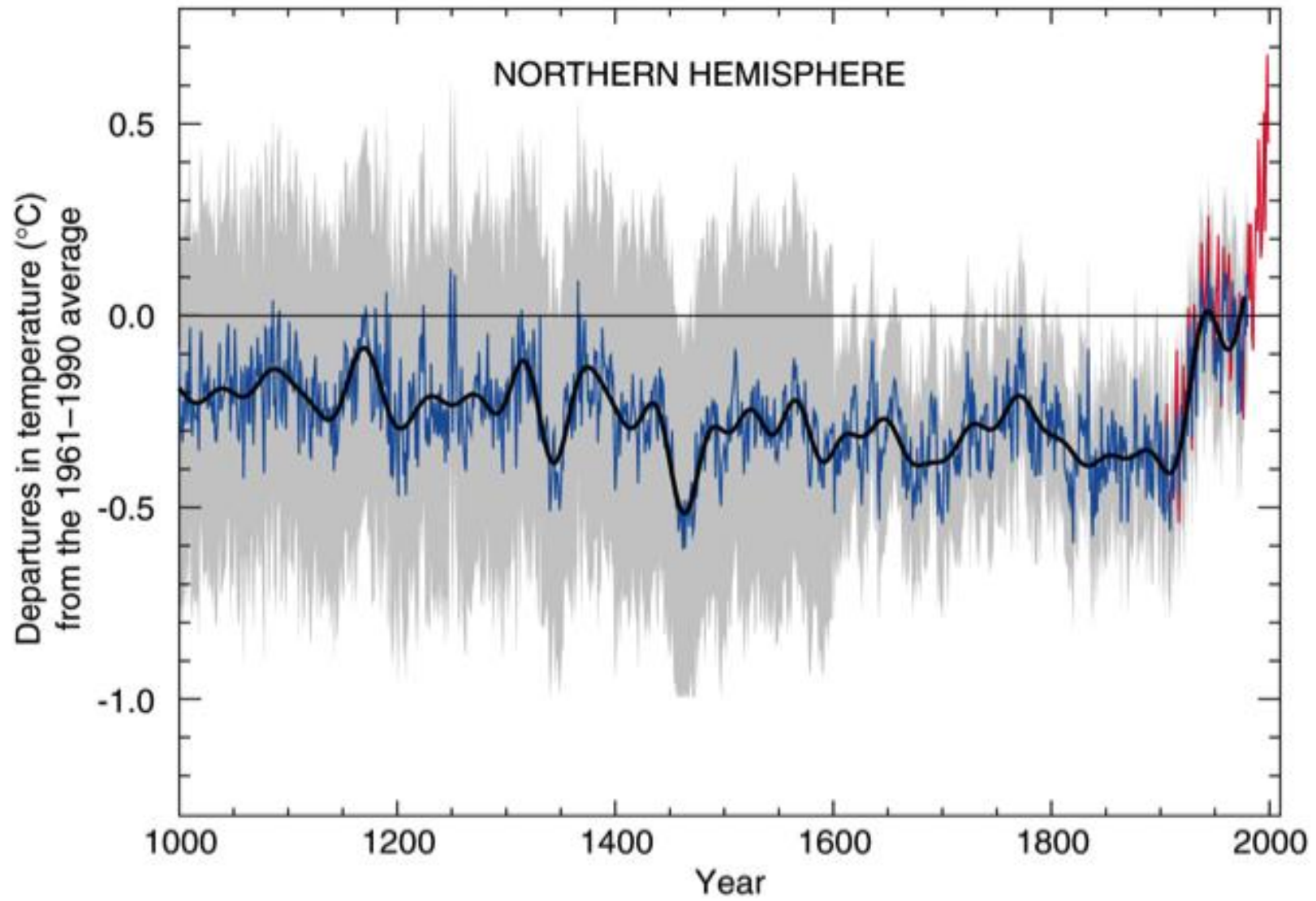
A climate change scenario



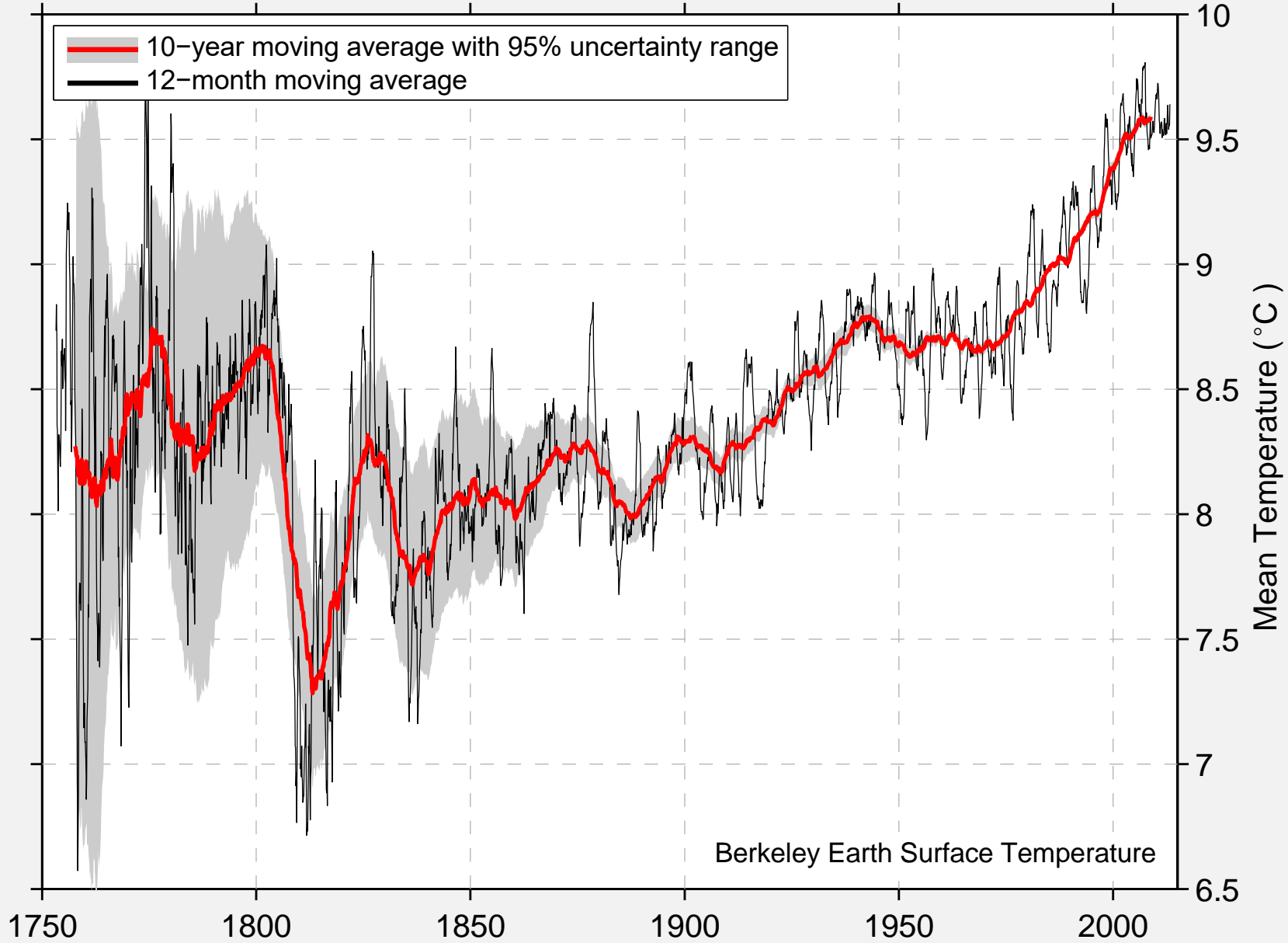


Temperature and CO₂ from Antarctic ice cores over the past 800,000 years

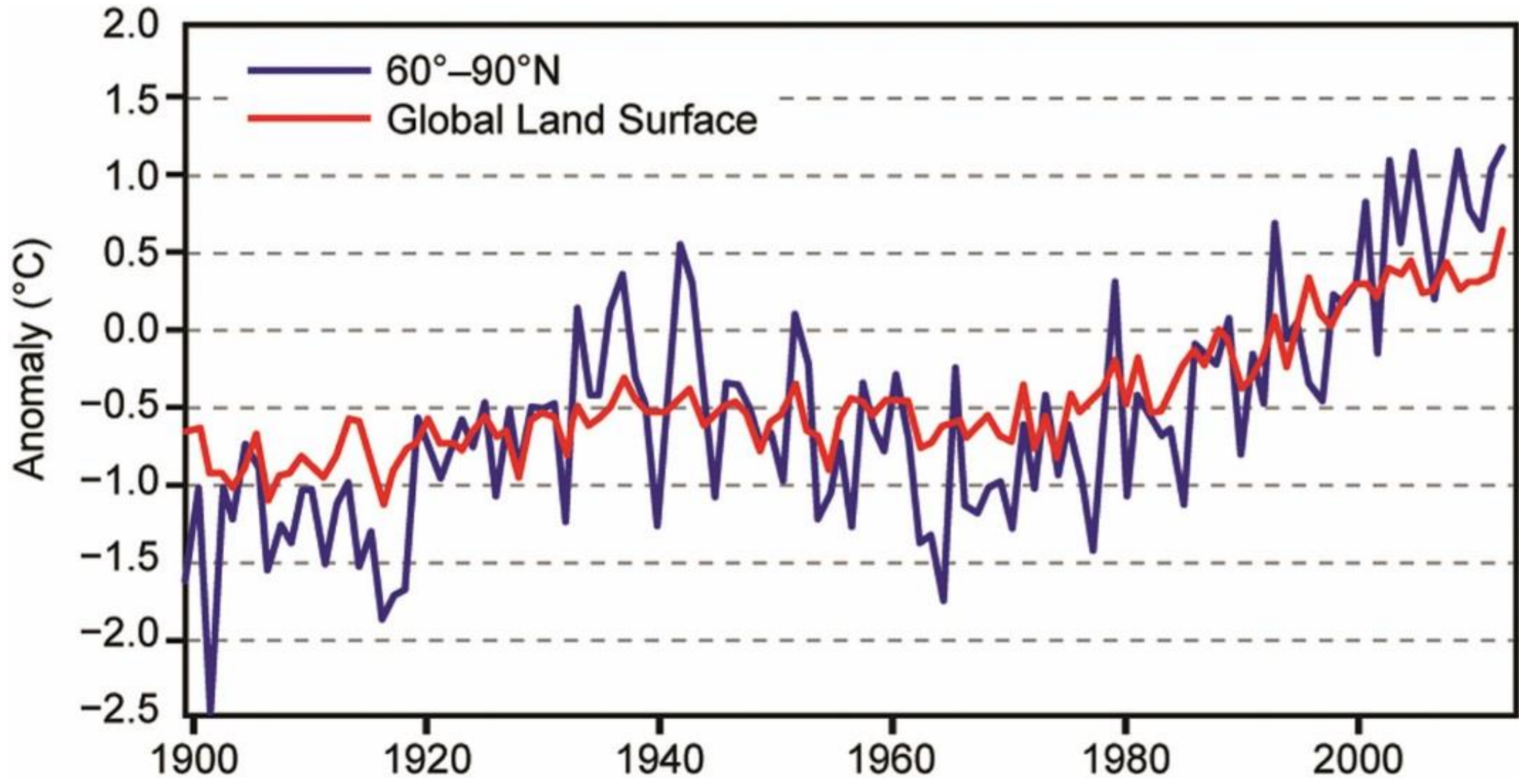


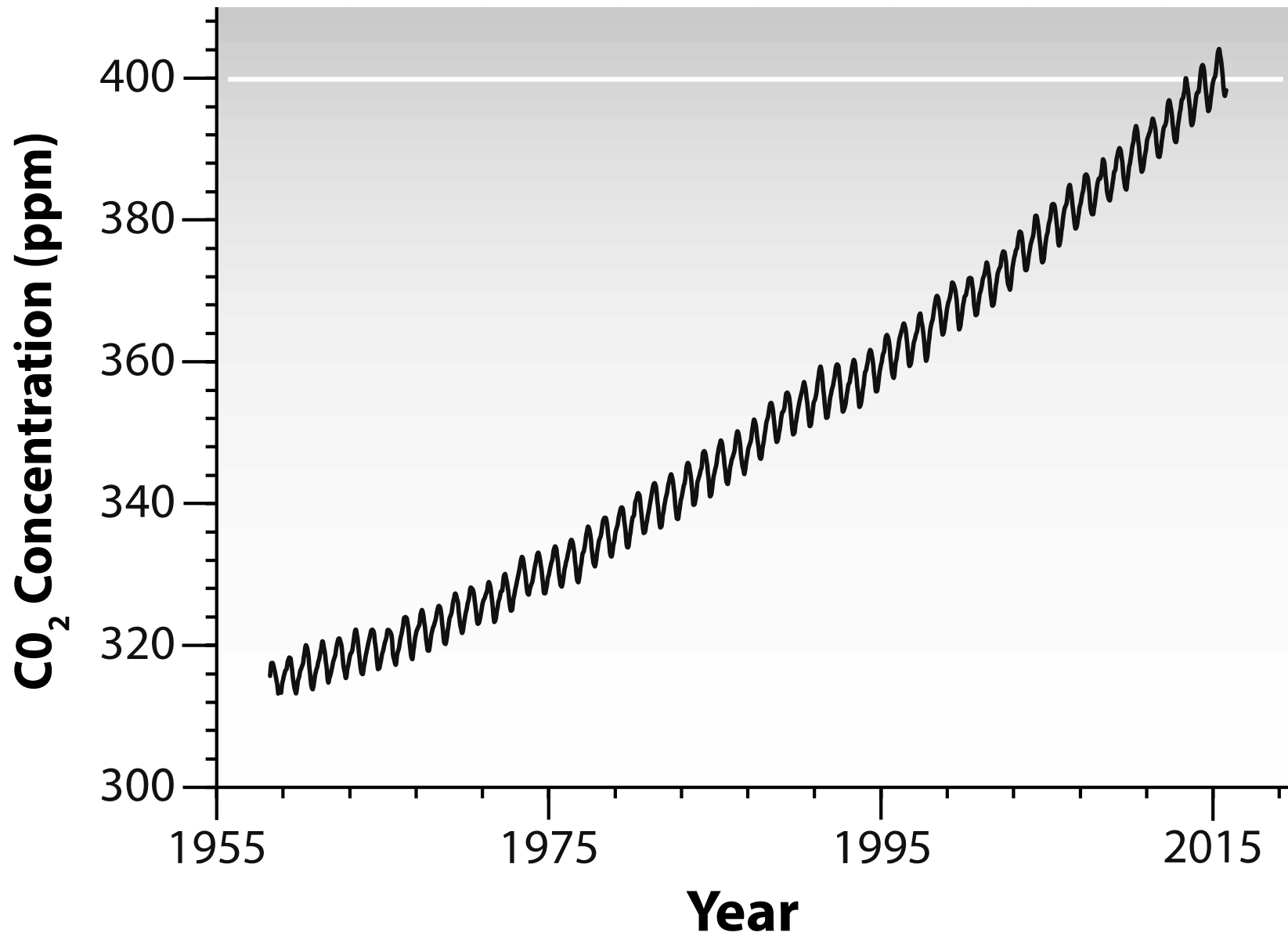


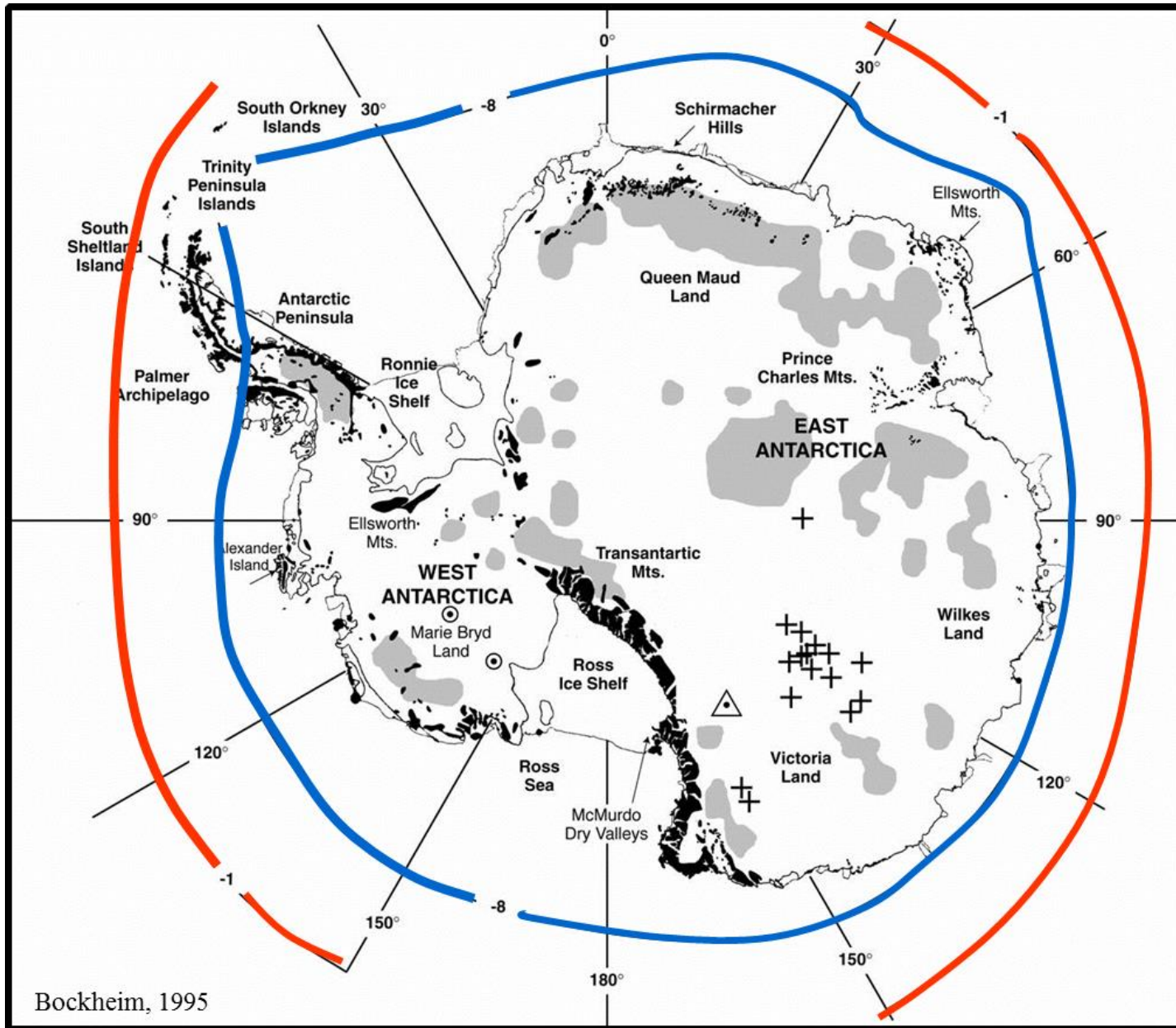
Global Land



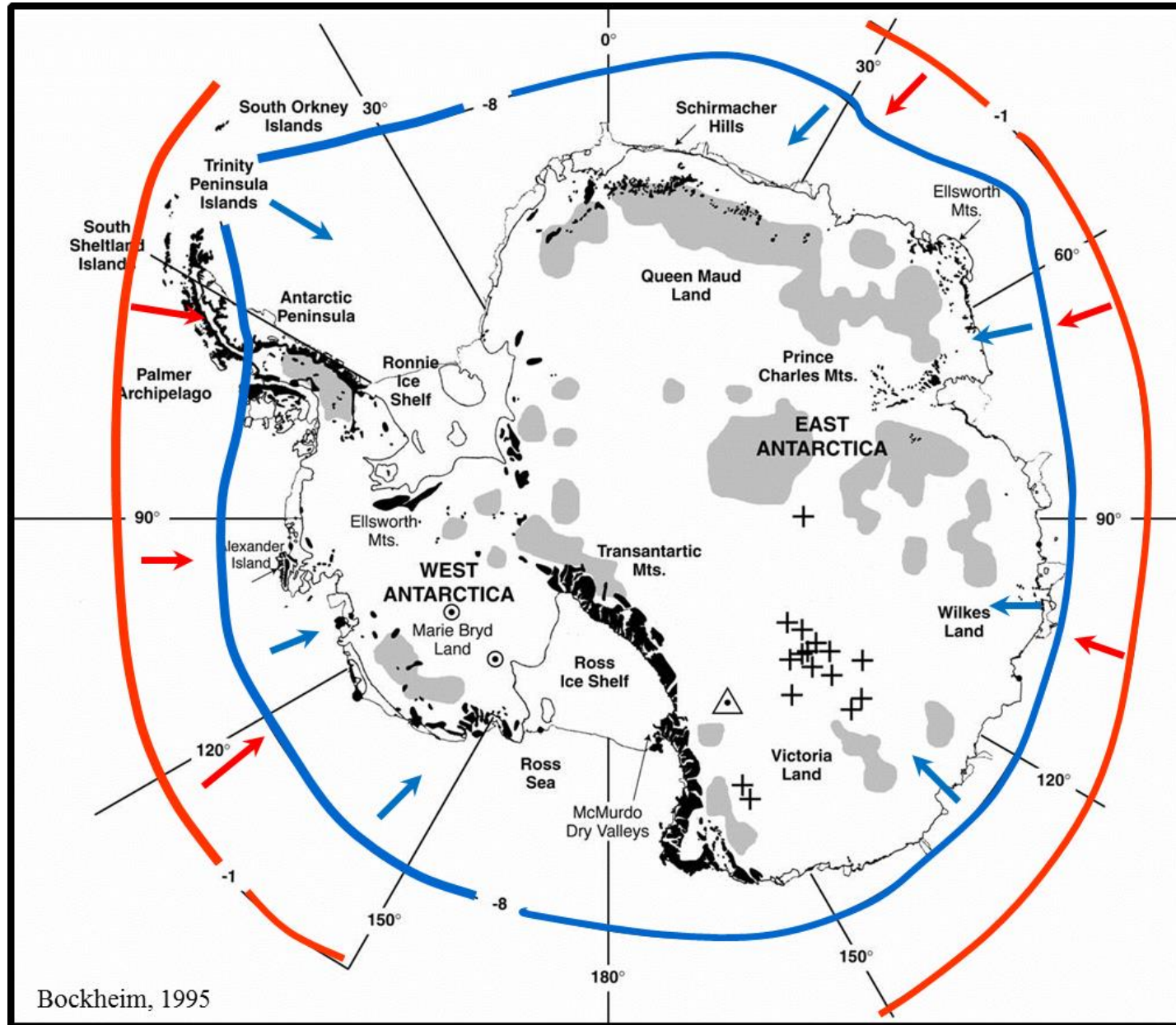
Berkeley Earth Surface Temperature



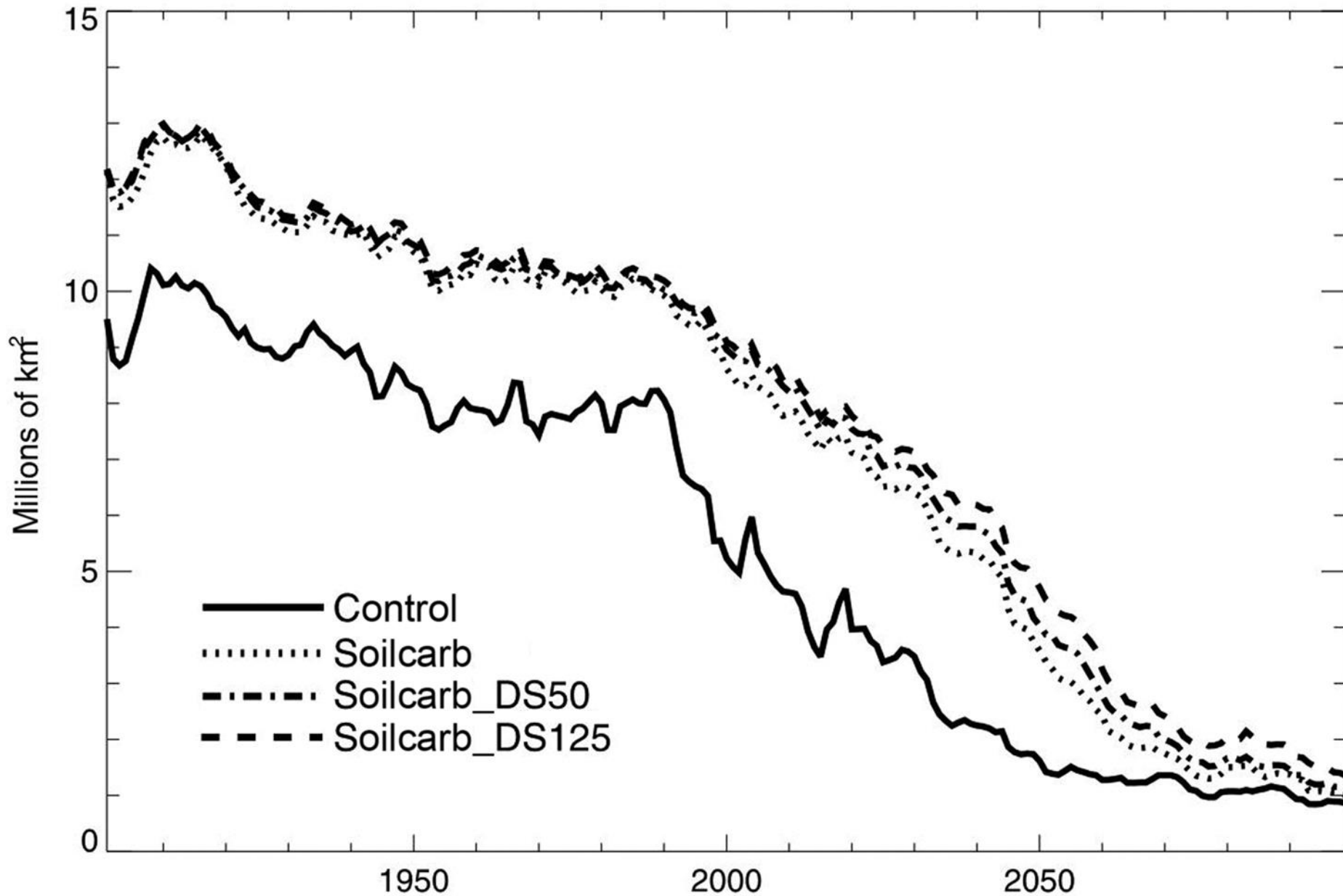


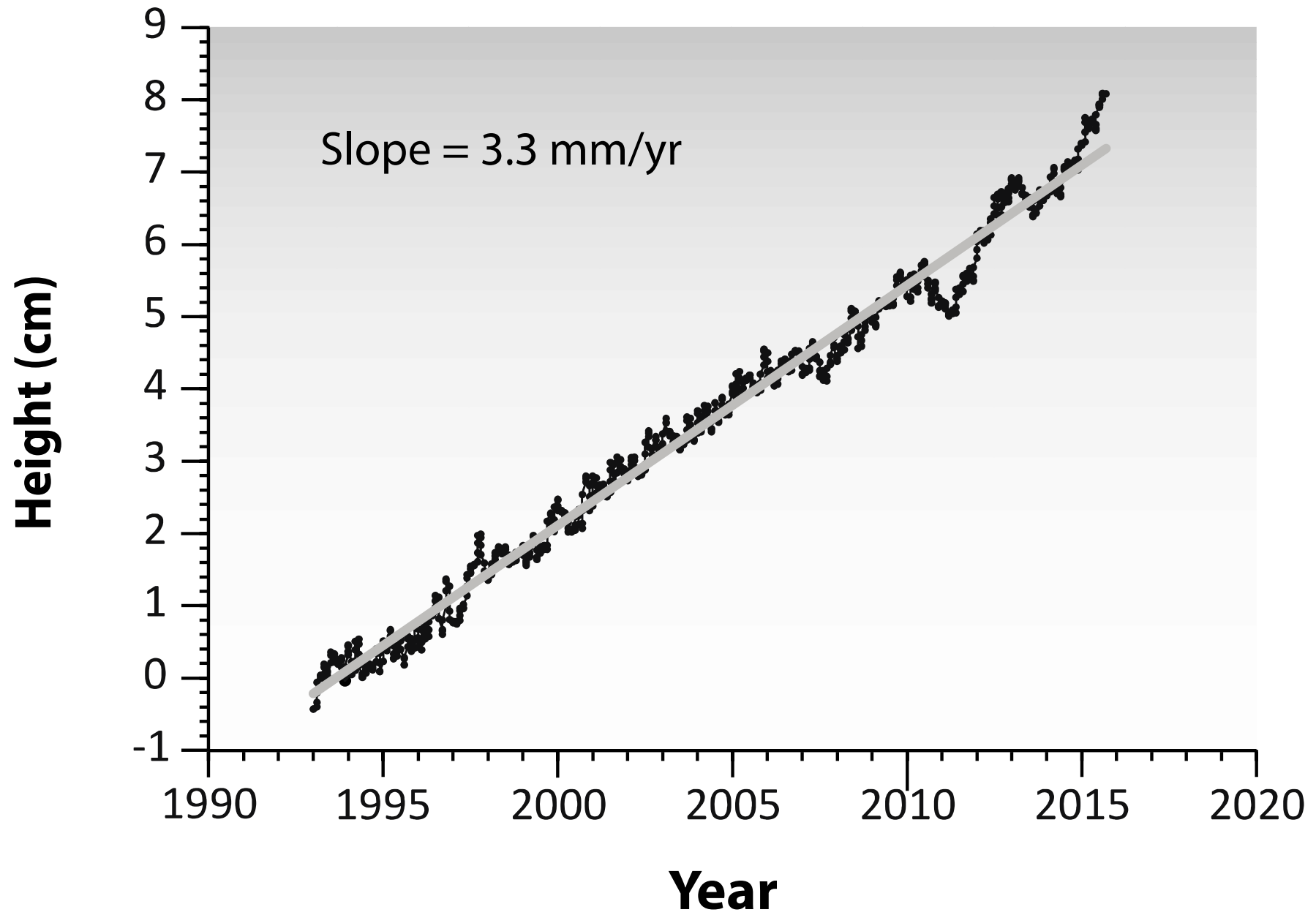


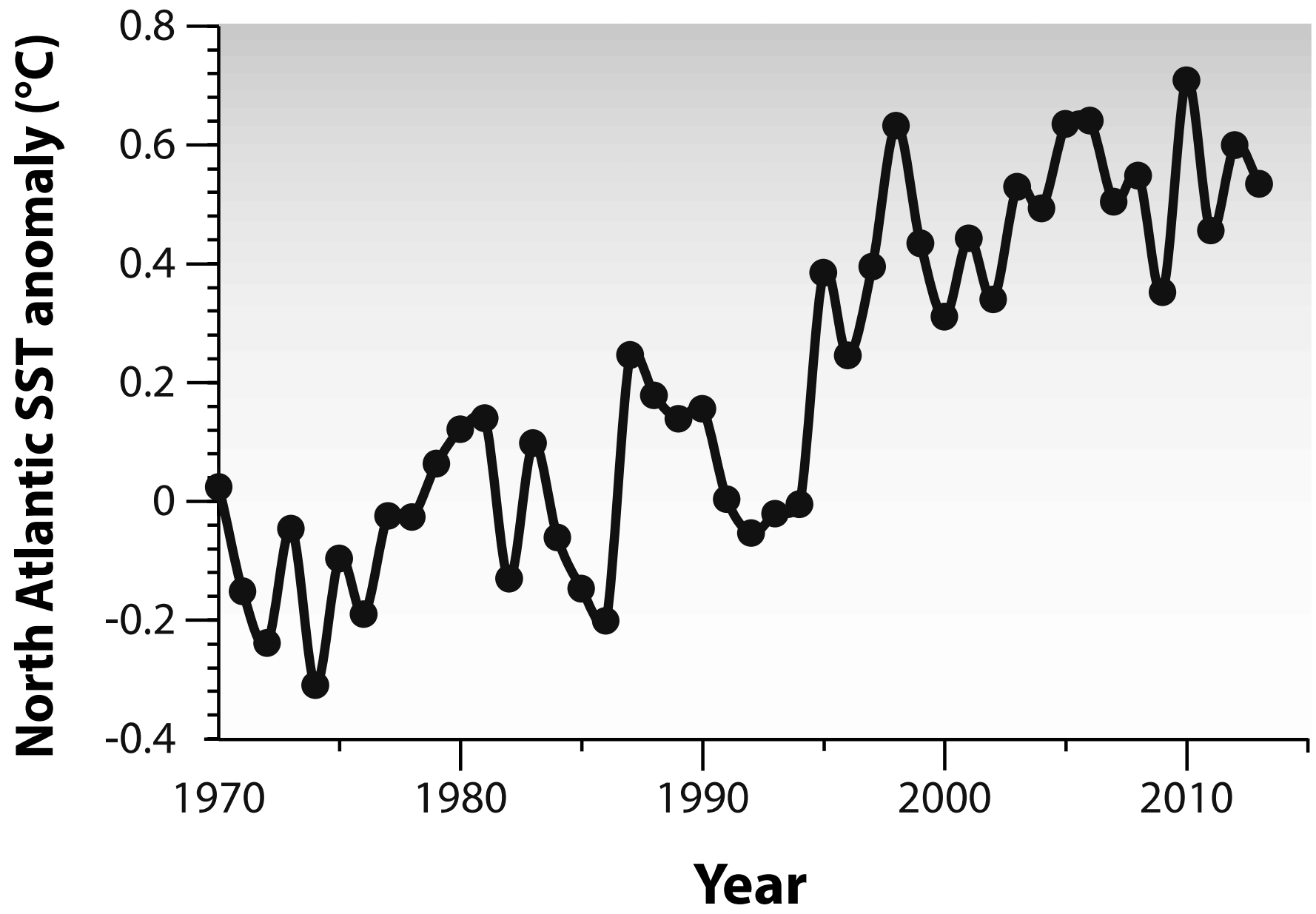
Bockheim, 1995

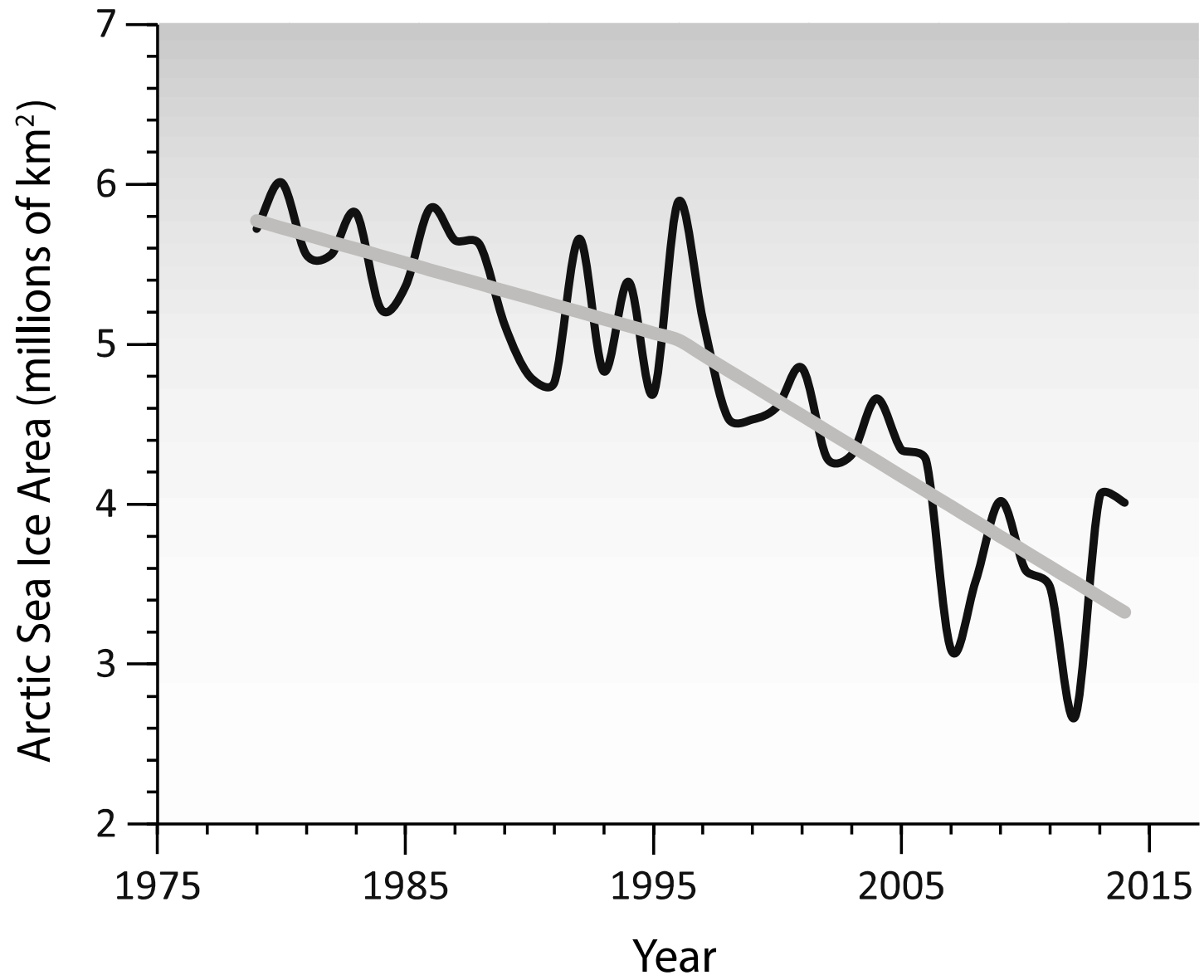


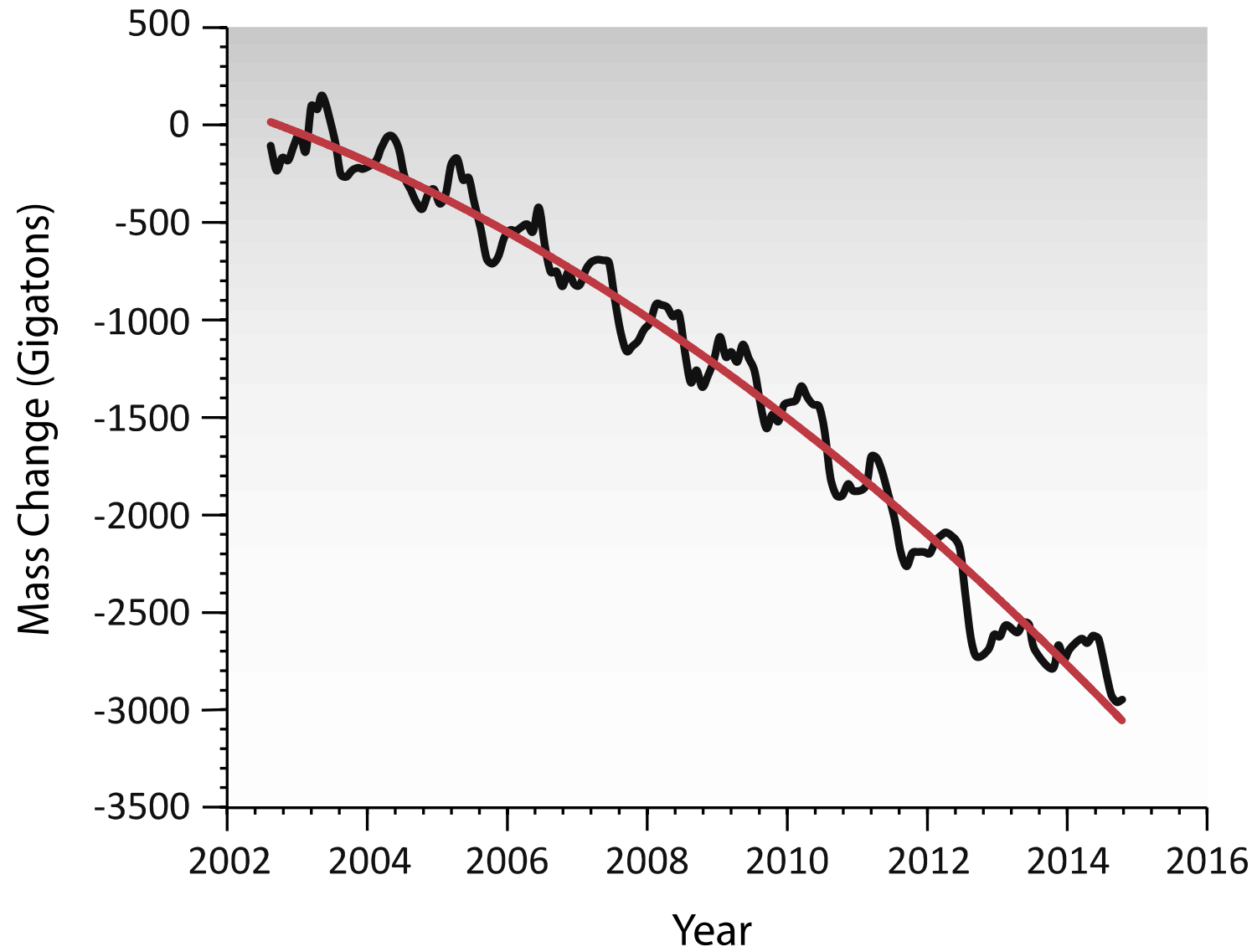
Area Containing Near-Surface Permafrost











The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station

The problems are:

1. In the case of a global warming scenario there will be an increase of the sea level
2. Contamination of aquifer
3. Thawing of the permafrost that supports the infrastructures

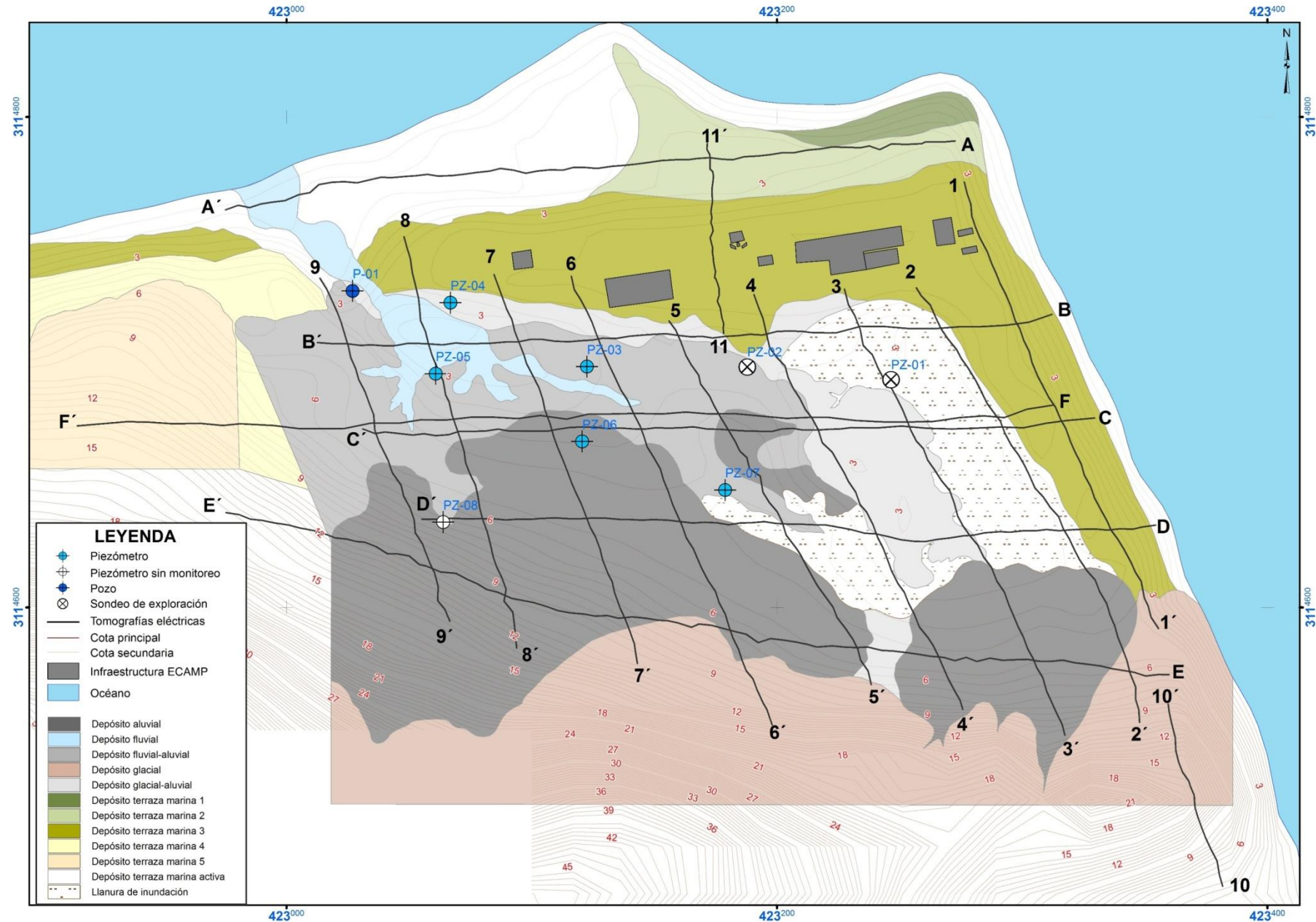
This means disappearance of the station; search for another location.

The Machu Picchu Antarctic Station

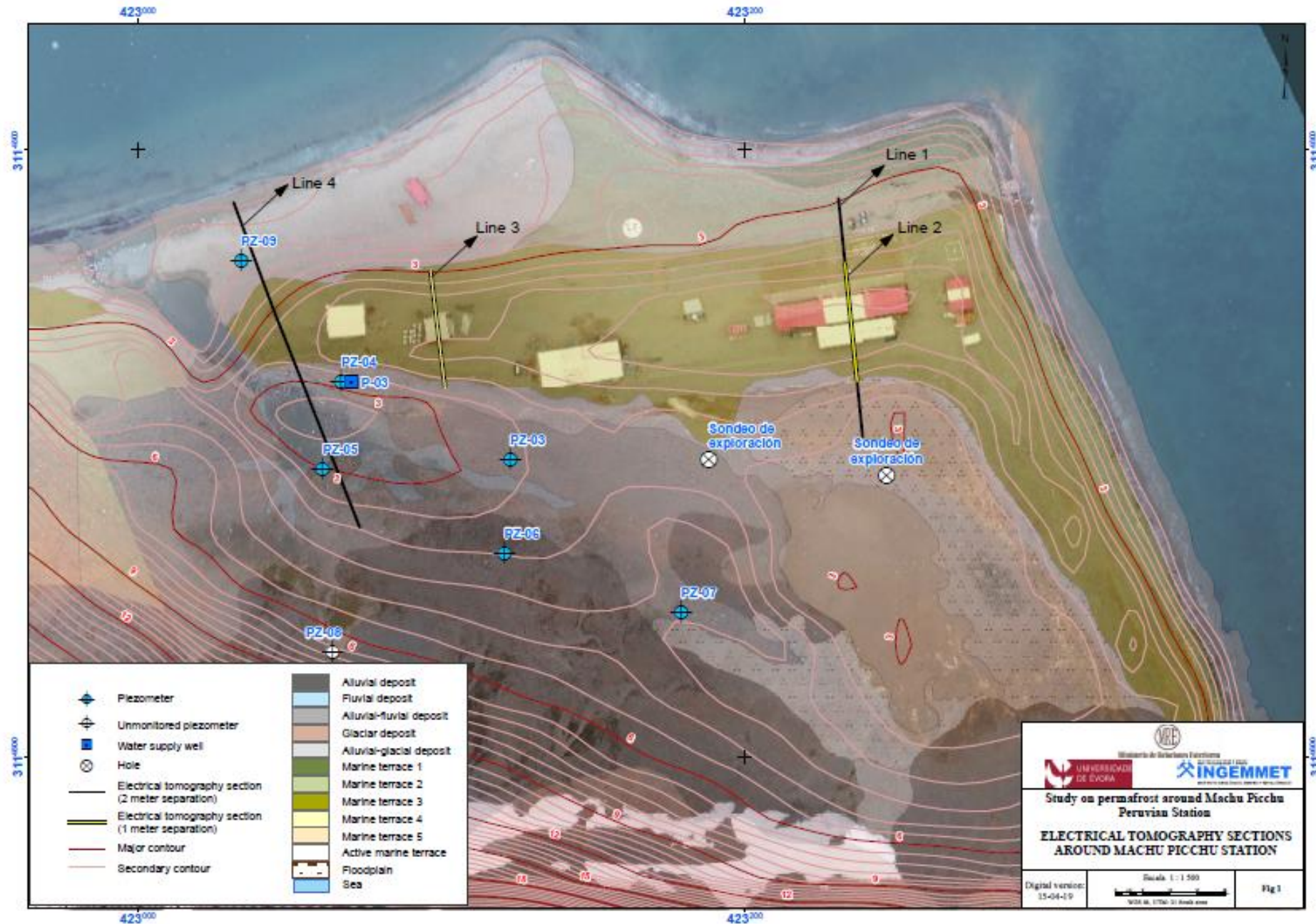
The solutions are:

1. Study permafrost evolution
2. Study the structure of the aquifer
3. Plan of exploitation of the aquifer to avoid sea water contamination

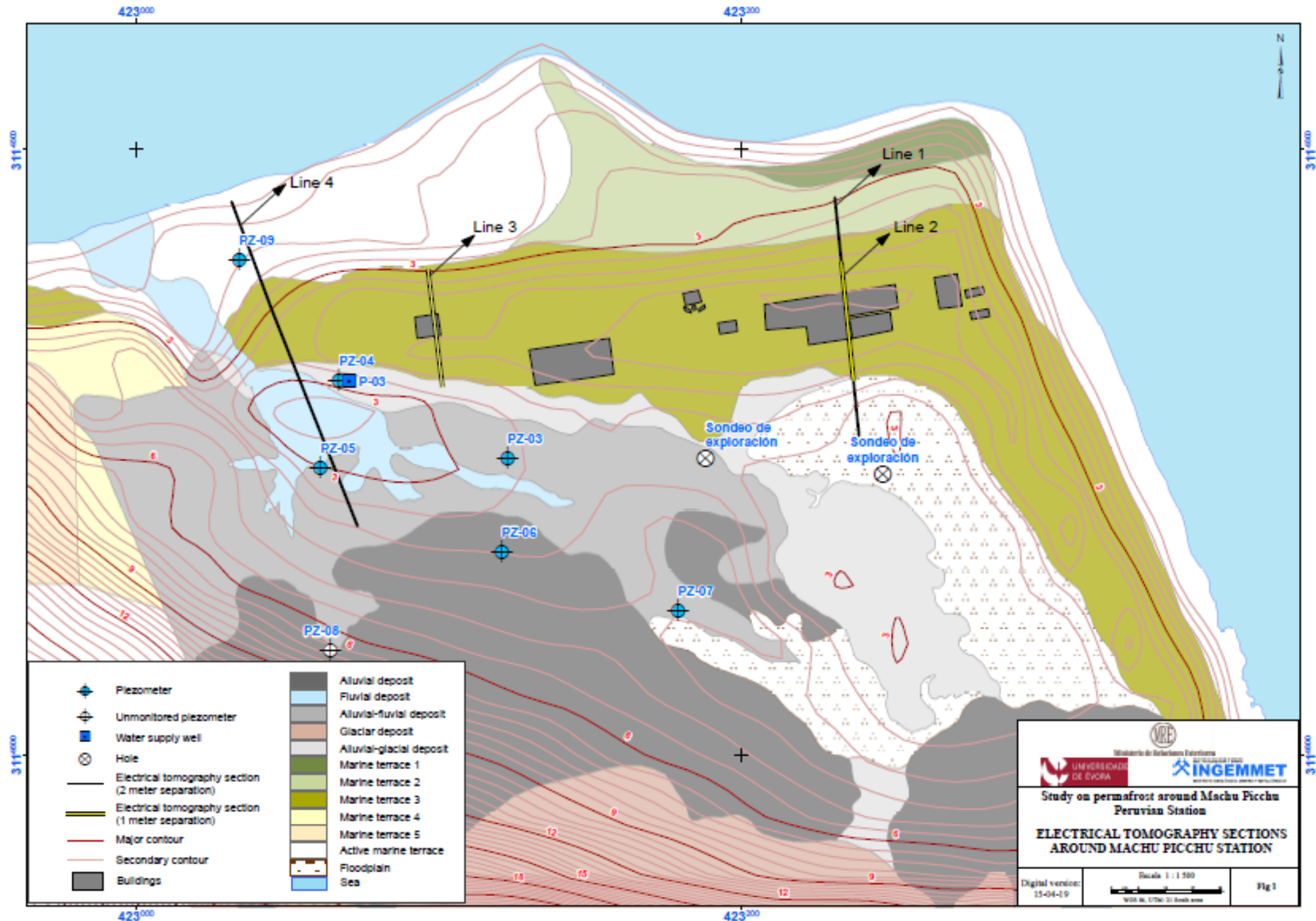
The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station

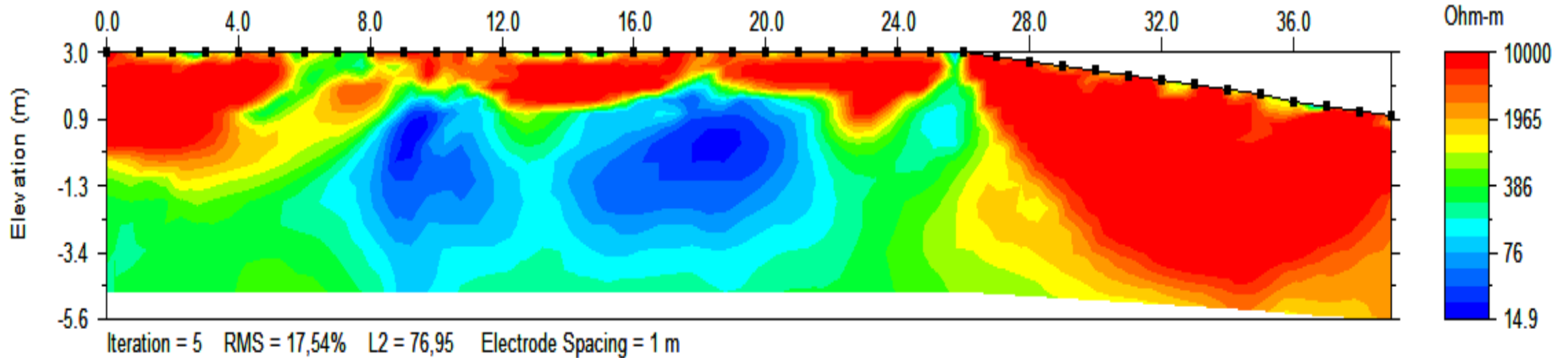


The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station

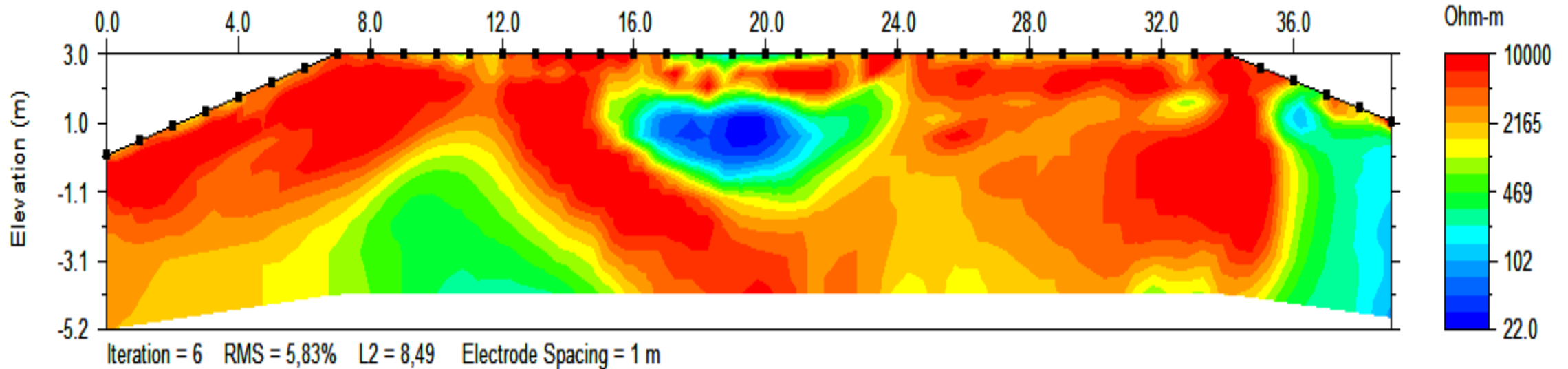
Main building



The Machu Picchu Antarctic Station



The Machu Picchu Antarctic Station Refuge



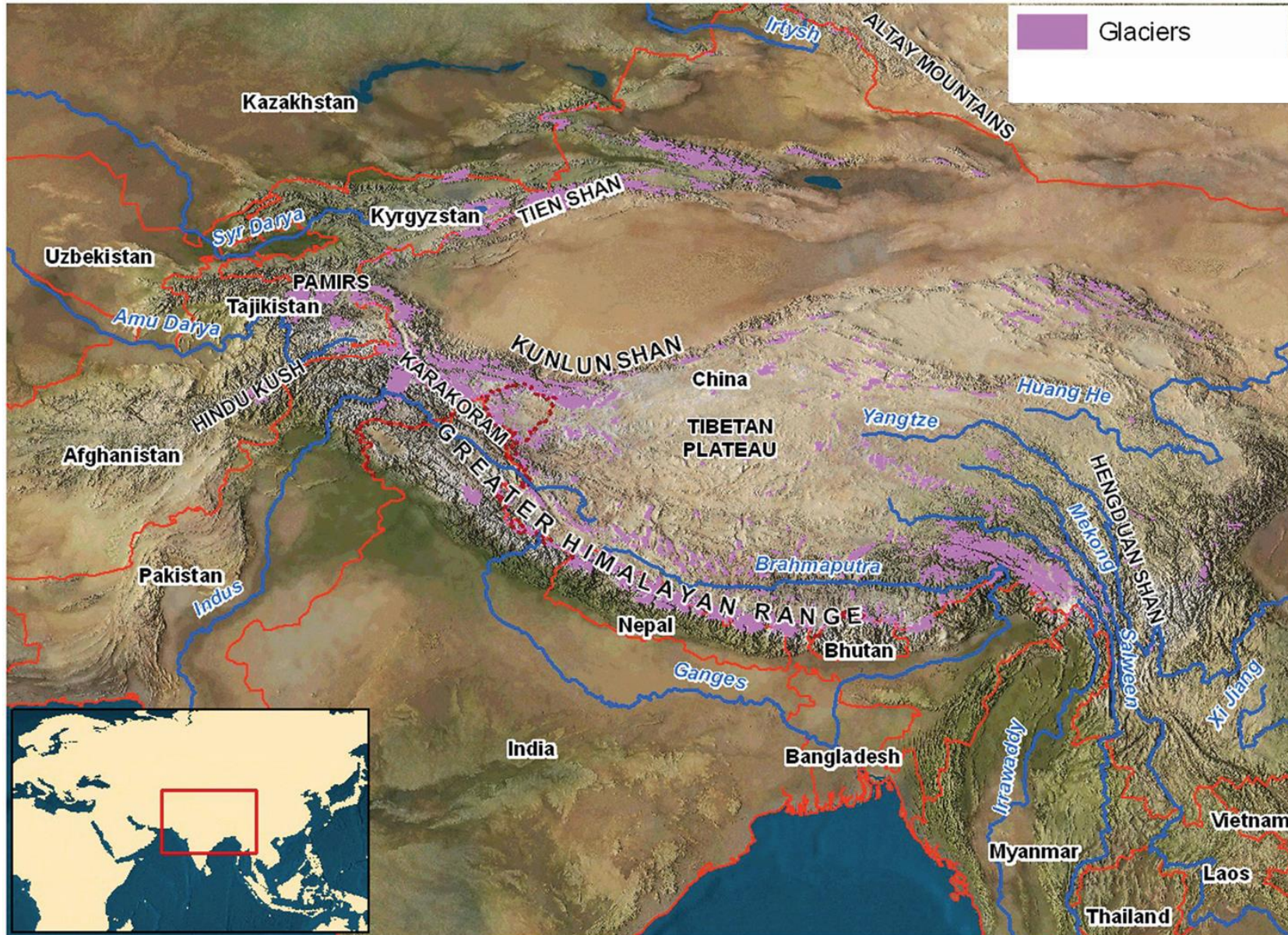
The Machu Picchu Antarctic Station



A scenic sunset over a beach. The sun is low on the horizon, partially obscured by a dark, rocky cliff on the left. The sky is filled with large, fluffy clouds that are illuminated from below, creating a warm, golden glow. The ocean is dark and calm, reflecting the light from the sun. In the distance, there are low mountains or hills. The overall mood is peaceful and serene.

Thank you

The third pole



The third pole

