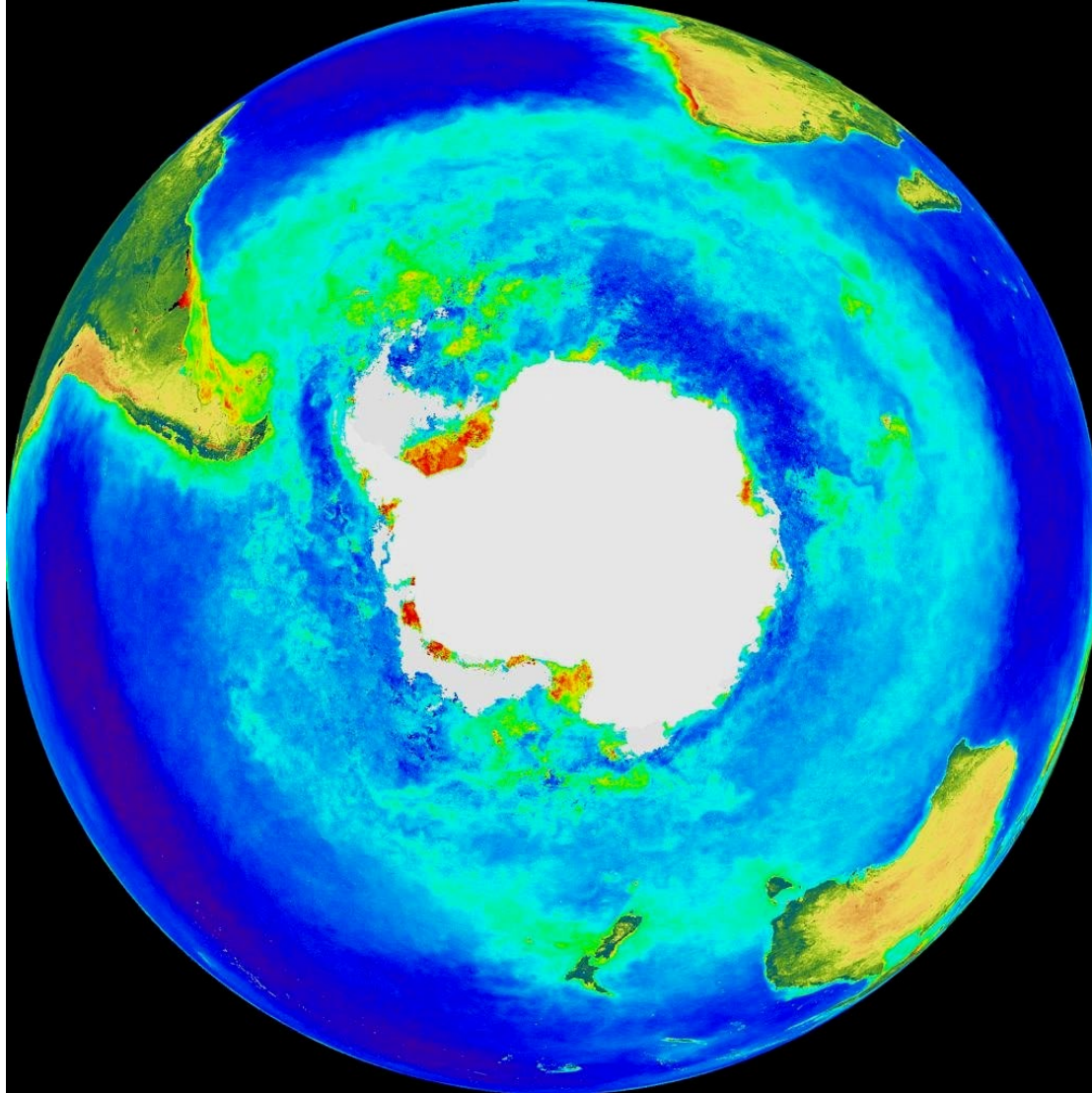


An Introduction to Antarctica





http://www.nasa.gov/mission_pages/icebridge/multimedia/fall11/antarctica-US_prt.htm

There are really two Antarcticas...



Antarctic Misconceptions

- always dark and extremely cold
- polar bears and reindeer present (as well as penguins in the Arctic)
- only scientists go there
- life is very harsh and difficult



Antarctic Facts

- coldest, windiest and most remote place on Earth
- mean annual temperature at -50°C (-18°C in Arctic)
- coldest recorded temperature on Earth at -89°C , or -129°F
but recent satellite data suggests -90 to -94°C
- 5.2 million sq. miles of which only $\sim 2\%$ ice-free
- ice sheets up to 2 km thick on average, ~ 4 km at thickest point
- interior has $< 2''$ precipitation per yr, a cold desert
- only two flowering plants, both in Peninsula
- no terrestrial vertebrates, only a few invertebrates

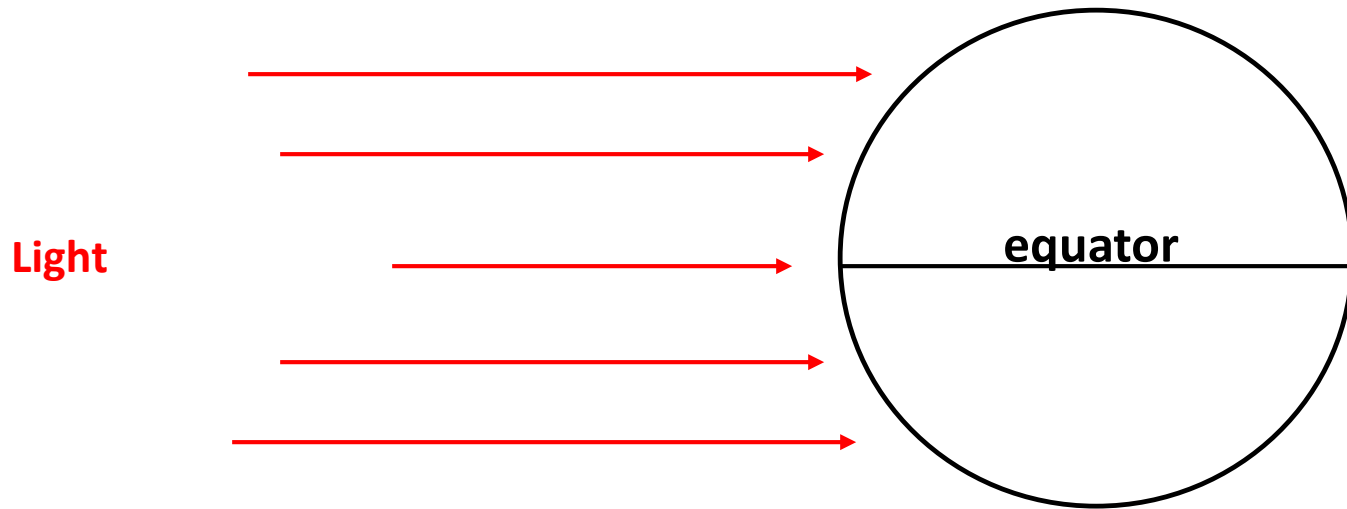
Why Antarctica has these characteristics:

Distribution of light on earth affected by:

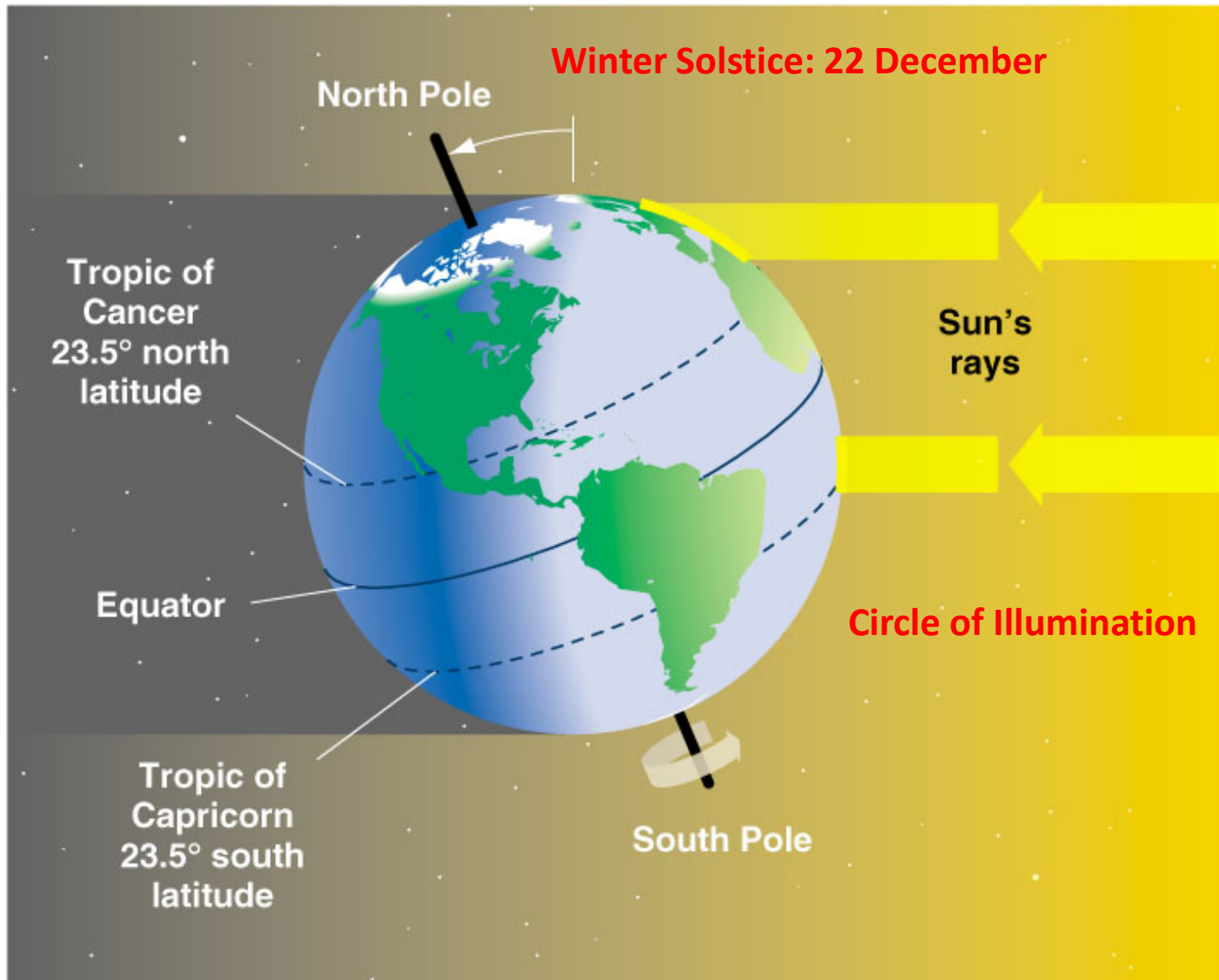
Curvature

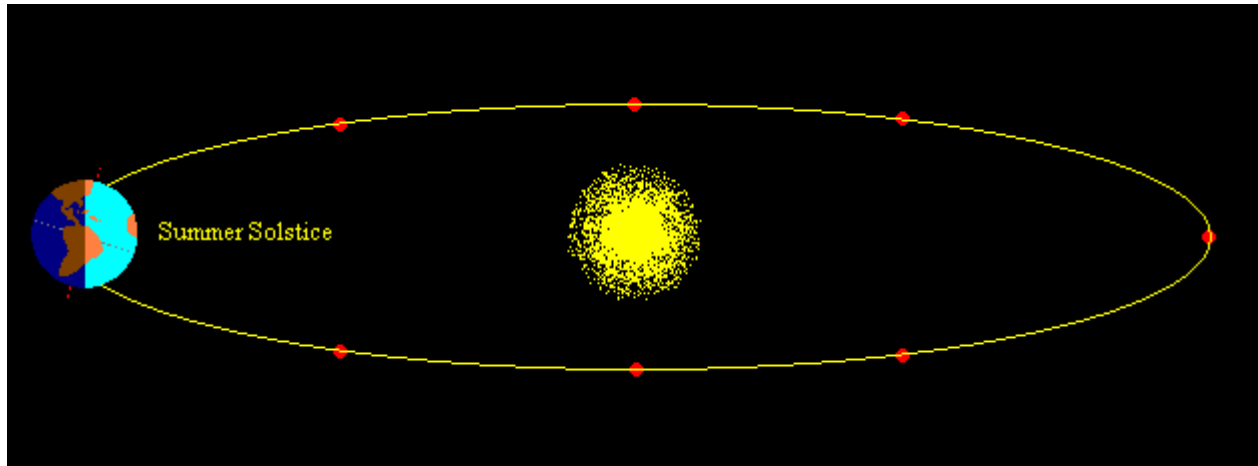
Tilt

Orbit



Coldest temperatures: solar radiation





Orbit, tilt, and curvature of earth result in increasing variation in **photoperiod** throughout the year at higher latitudes.

Distribution of light on earth affected by:

Curvature

Tilt

Orbit

Albedo



High reflectivity = High albedo and less heat absorption at surface



Table 1.1 Albedos of various natural surfaces

Surface	Albedo
Snow-covered sea ice	0.95
Fresh snow	0.8–0.85
Melting snow	0.3–0.65
Quartz sand	0.35
Granite	0.15
Bare earth	0.02–0.18
Coniferous forest	0.10–0.14
Water	0.02
The Earth as a whole	0.43

Total reflection: Albedo = 1.0

Why Study Antarctica?

- helps to understand fossil record, paleobiogeography**
- development of Earth's climate, past and present**
- last relatively pristine place on Earth**
- evolution of species in extreme environments**
- human presence growing, future interest in resources**
- vital for climate change and sea level rise now and
in the future (70% of earth's fresh water in ice)**
- fascinates the imagination due to its extreme conditions
and remote location**

[Course Website and Syllabus](#)

Reading on Antarctic Winds

Literature Review Assignment

Literature Assignment

Due by 2 Sept.

Journals on Antarctic Research

[Antarctic Science](#)

[Polar Biology](#)

Articles on Antarctica also can be found in many other Journals including:

Marine Ecology Progress Series

Science

Scientific Reports

PloS One

Nature

Global Change Biology

...and many others

Citation format:

Smith, B. and J. Smith. 2010. Antarctic ecology. *Antarctic Science* 24: 12-26.