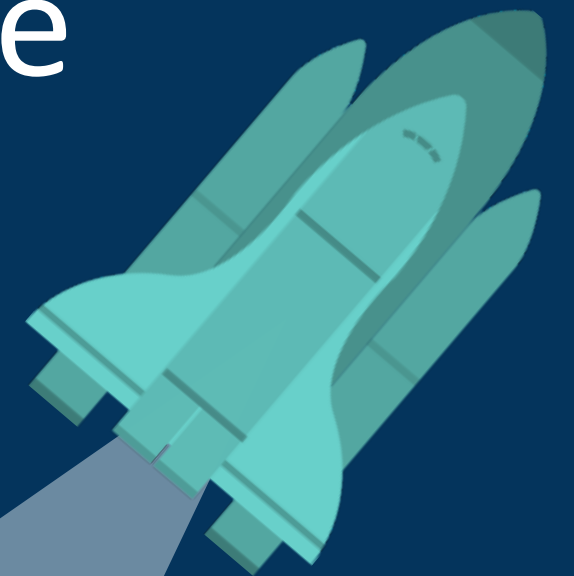




Martian Chemistry

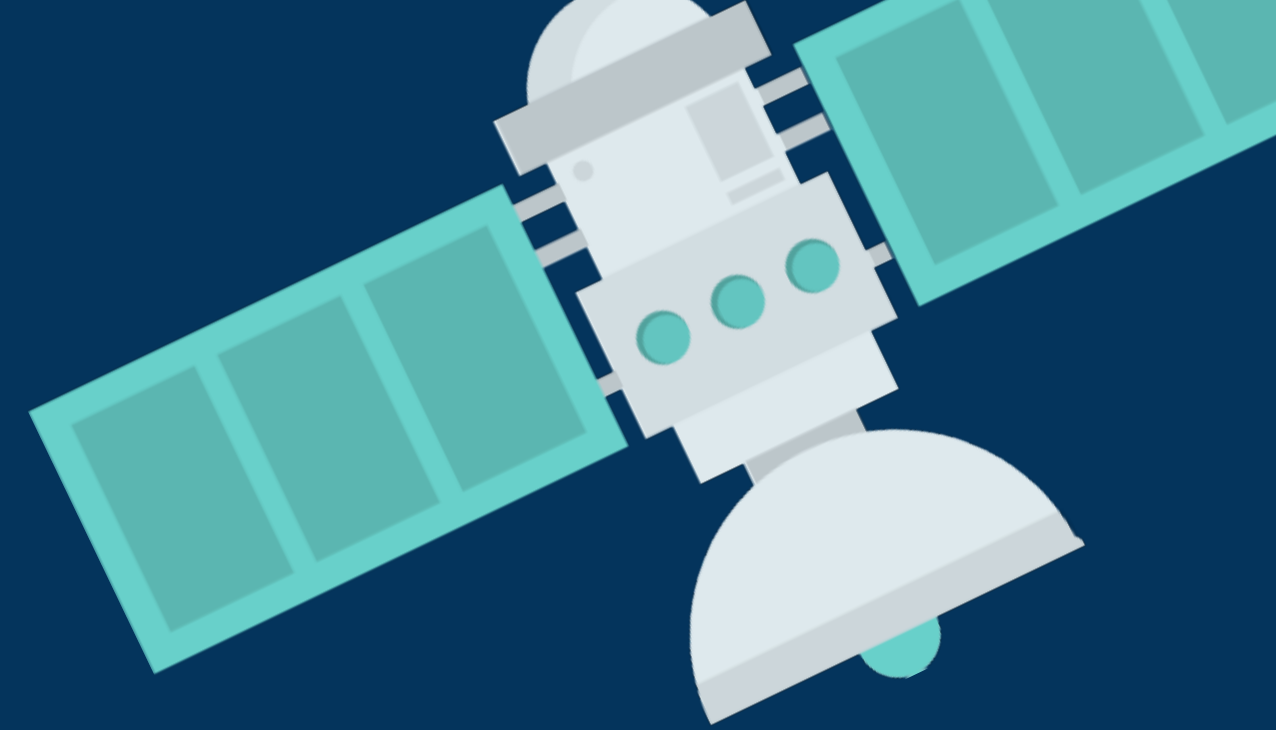
Understanding the Chemistry of the Martian Surface



Objectives

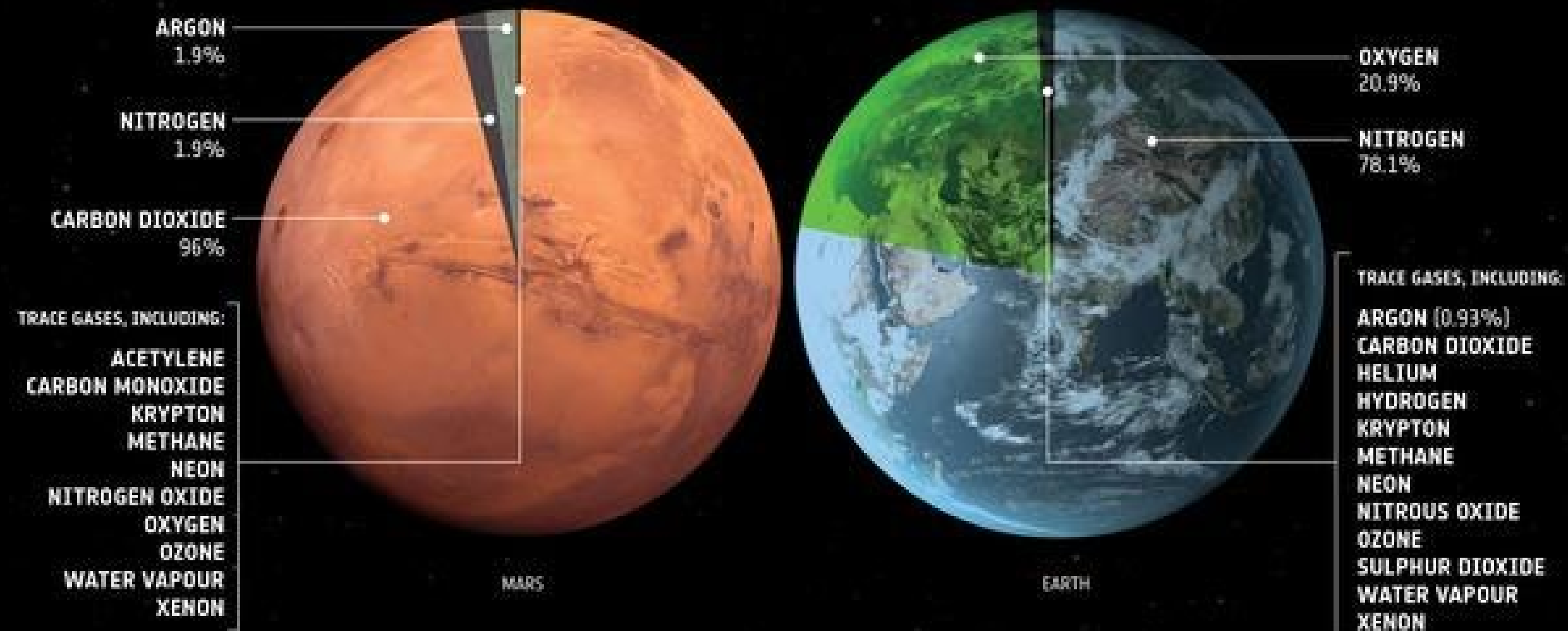
By the end of this lesson you will be able to:

- Understand what effect temperature has on the chemistry of Mars
- Explain how salinity affects freezing points
- Review how all of the above affect habitability



Mars's Atmosphere

→ COMPARING THE ATMOSPHERES OF MARS AND EARTH



Atmospheric composition by volume | Planets not to scale | Atmosphere of Mars is less than 1% of Earth's | Trace gases listed alphabetically

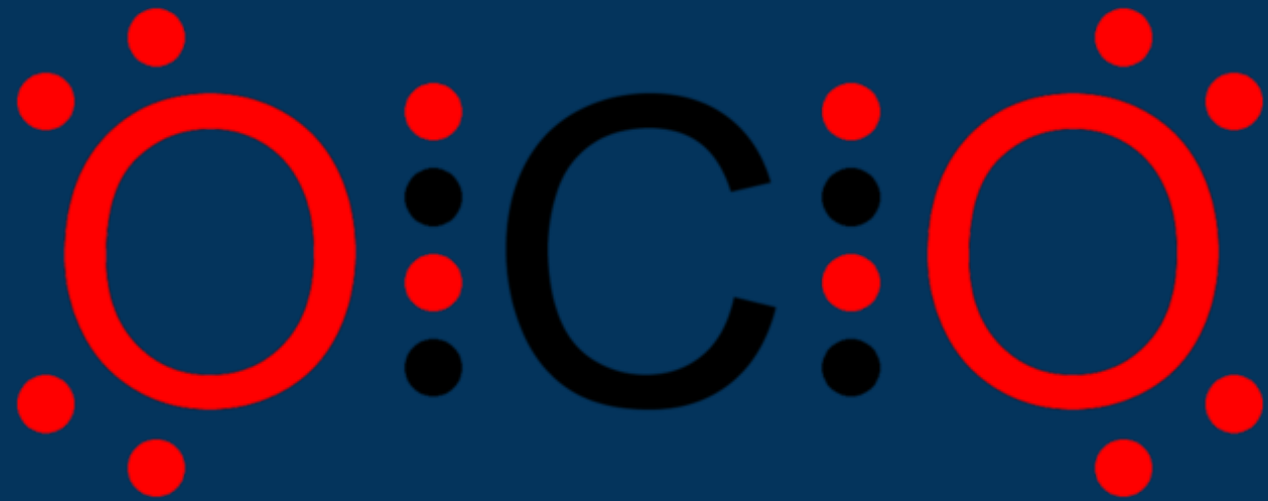
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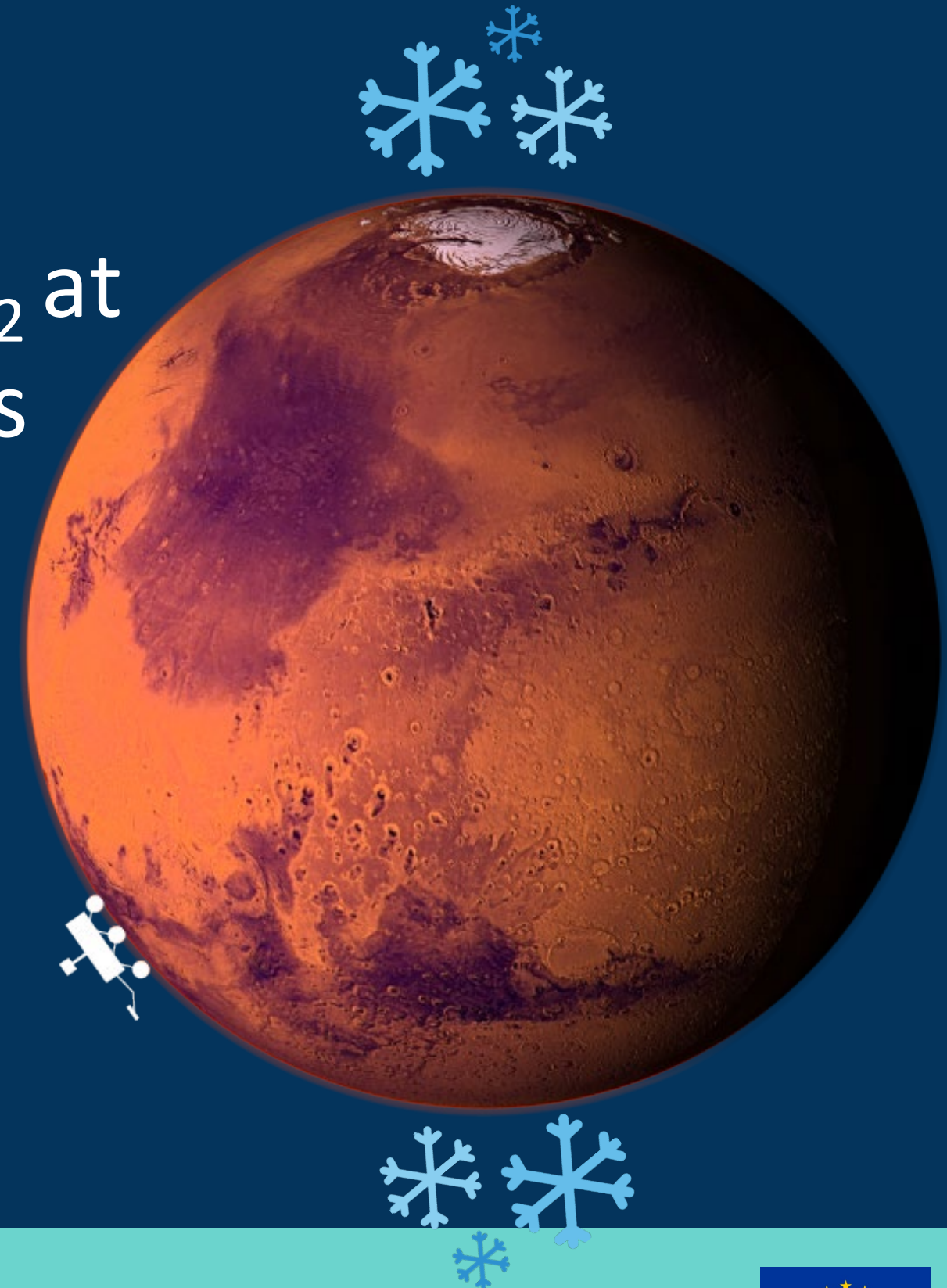


Introduction to Carbon Dioxide

- Chemical formula – CO_2



- Solid CO_2 at the poles of Mars



Does Carbon Dioxide melt?

Click button below to link to video:



Subglacial Lake on Mars?

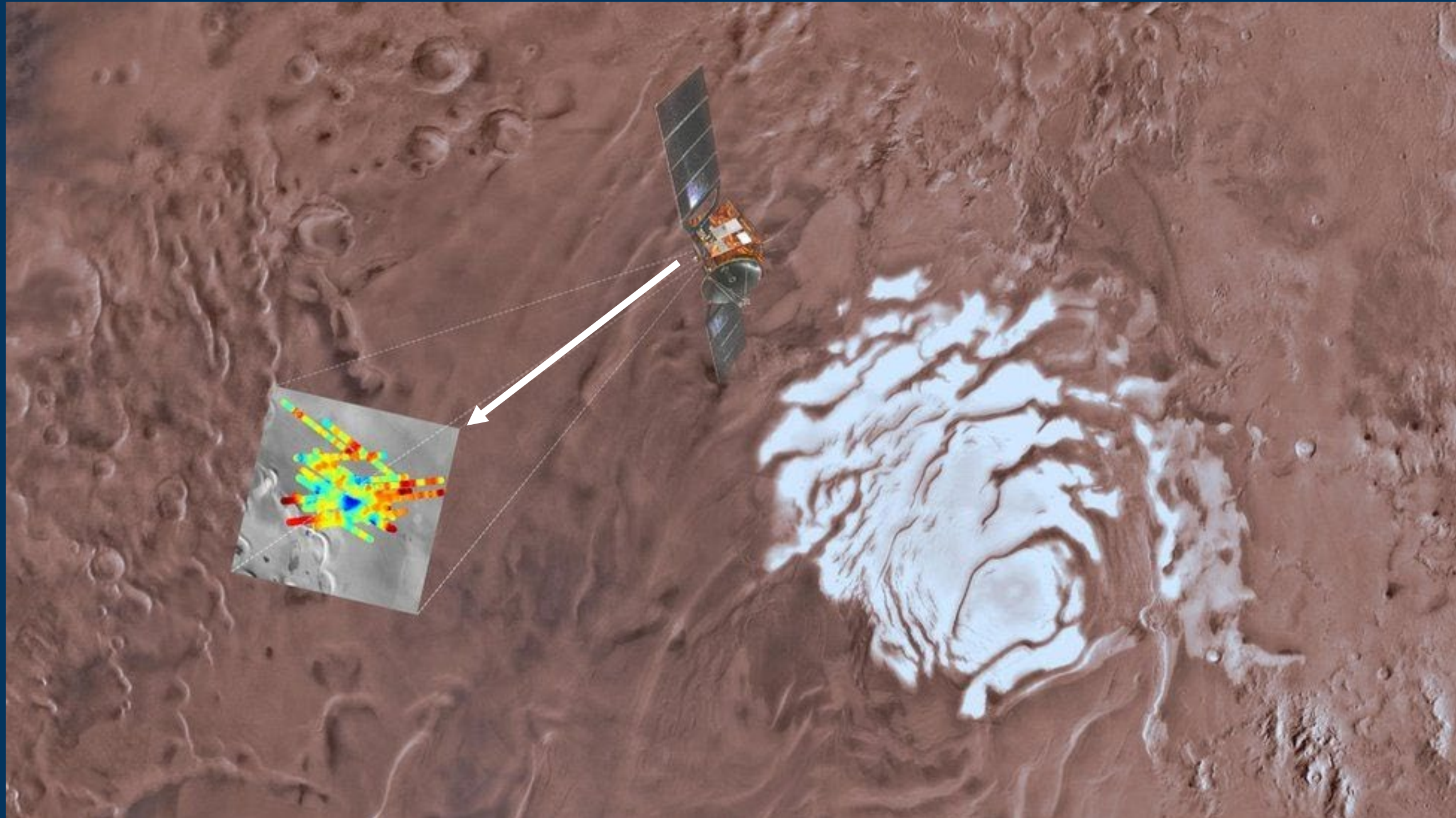
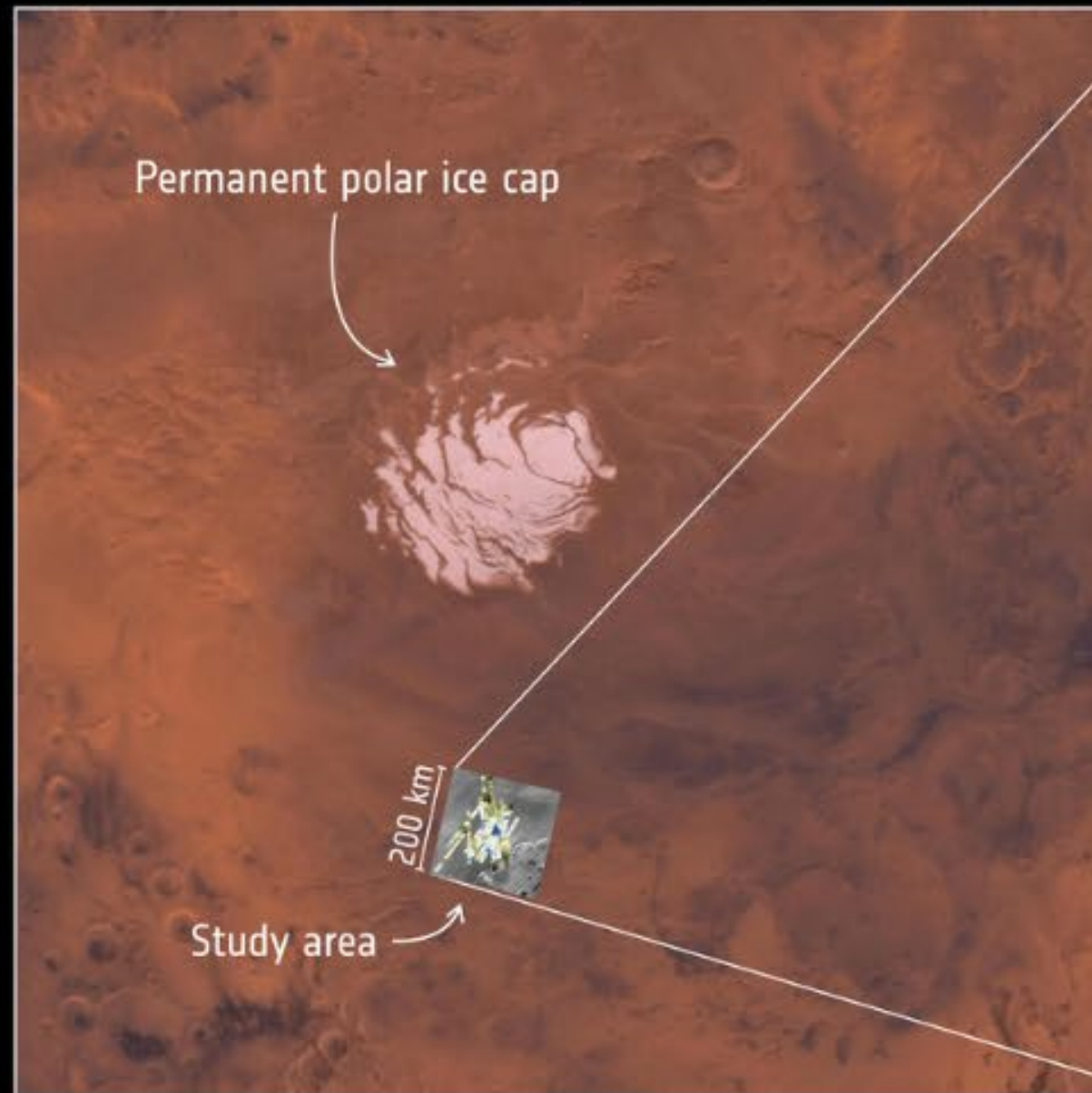
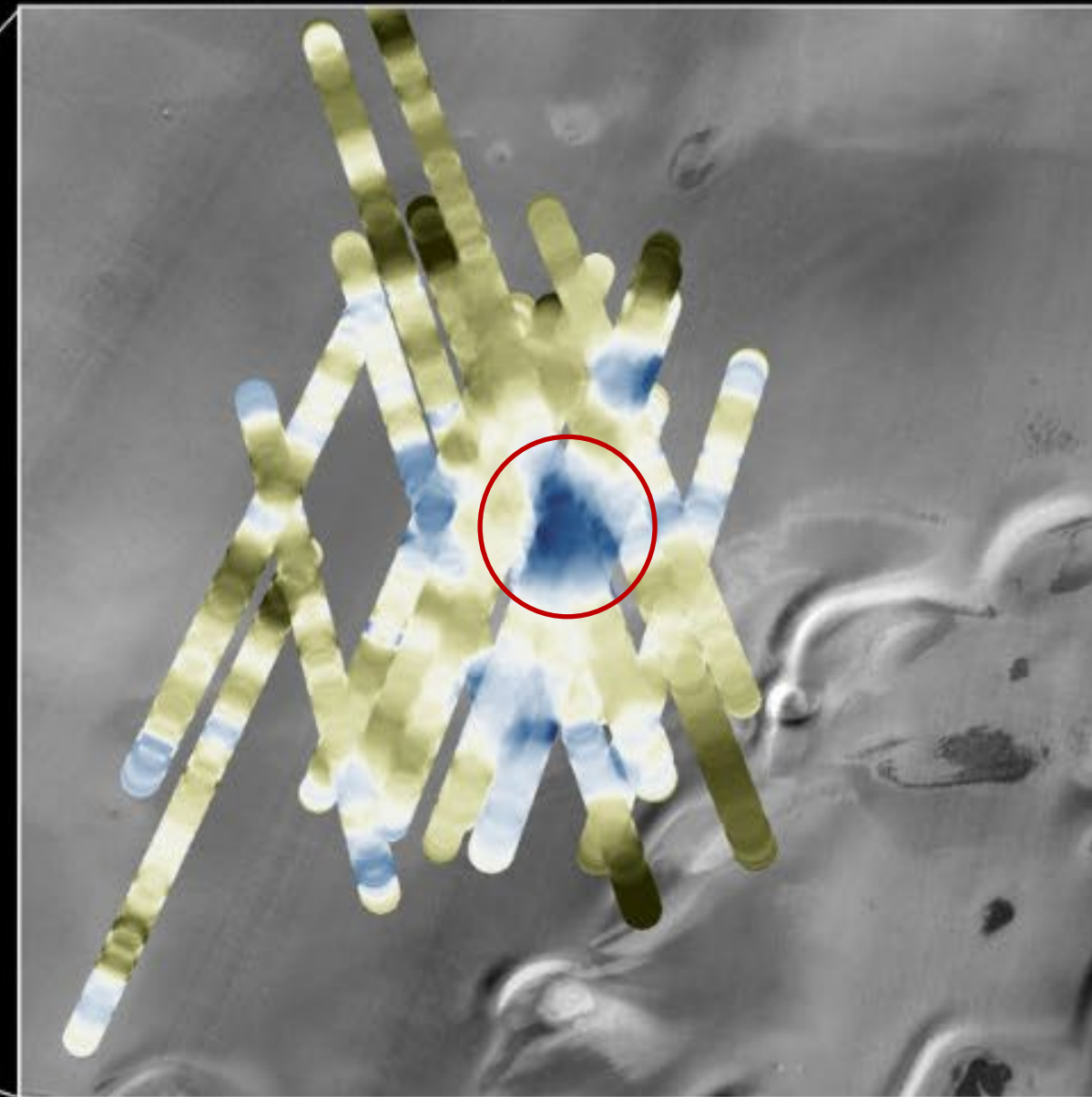


Image credit: USGS Astrogeology Science Center, Arizona State University, INAF

Mars south polar region



Mars Express radar footprints
(blue = brightest radar echo)



Radar image of subsurface

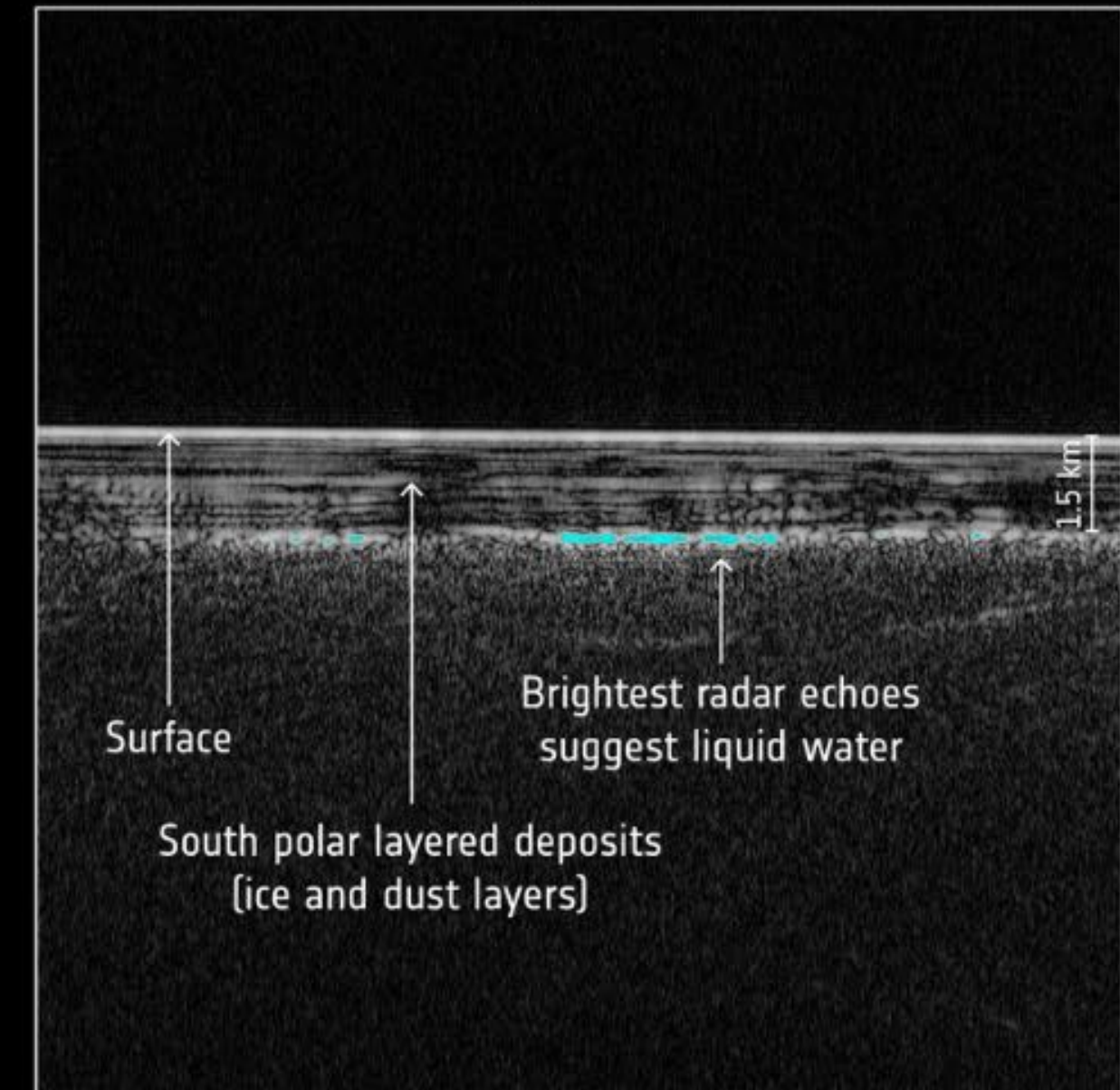


Image credit: ESA

Salts and freezing points



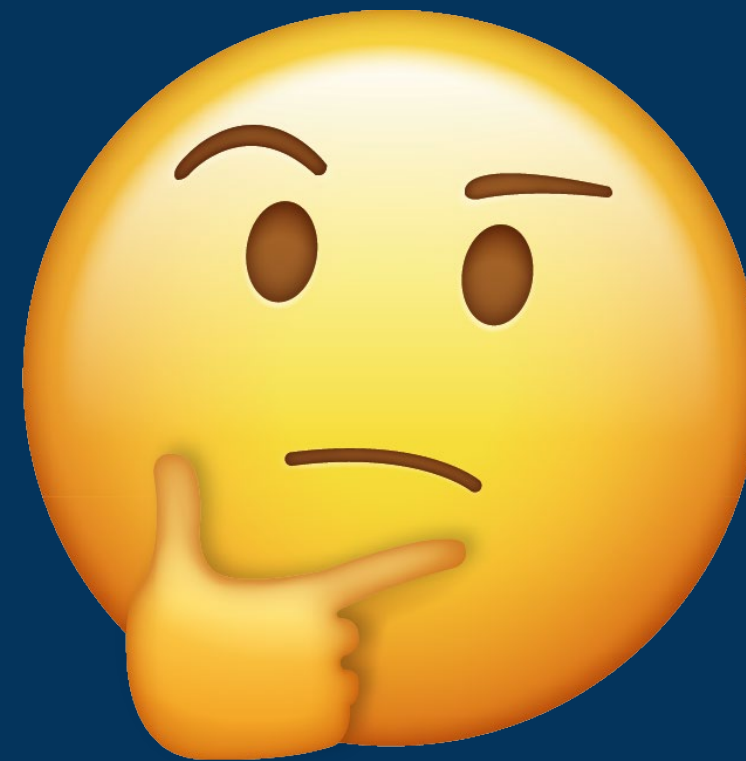
How does salt affect freezing rate?

Click button below to link to video:



What happened? Why?

Discuss in groups



Kangerlussuaq, Greenland



- Only permanent ice sheet outside of Antarctica
- Large areas of permafrost
- As cold as -20°C !!



Image credit: Aarhus University



Do you think life could exist in:

- Kangerlussuaq?..... ☐ ☐
- Sub-glacial lake on Mars?..... ☐ ☐
- Neither?..... ☐ ☐
- Both?..... ☐ ☐



- Discuss in groups for 5 minutes
- Feedback thoughts



Recap

Answer these questions
from what you have
learned today:



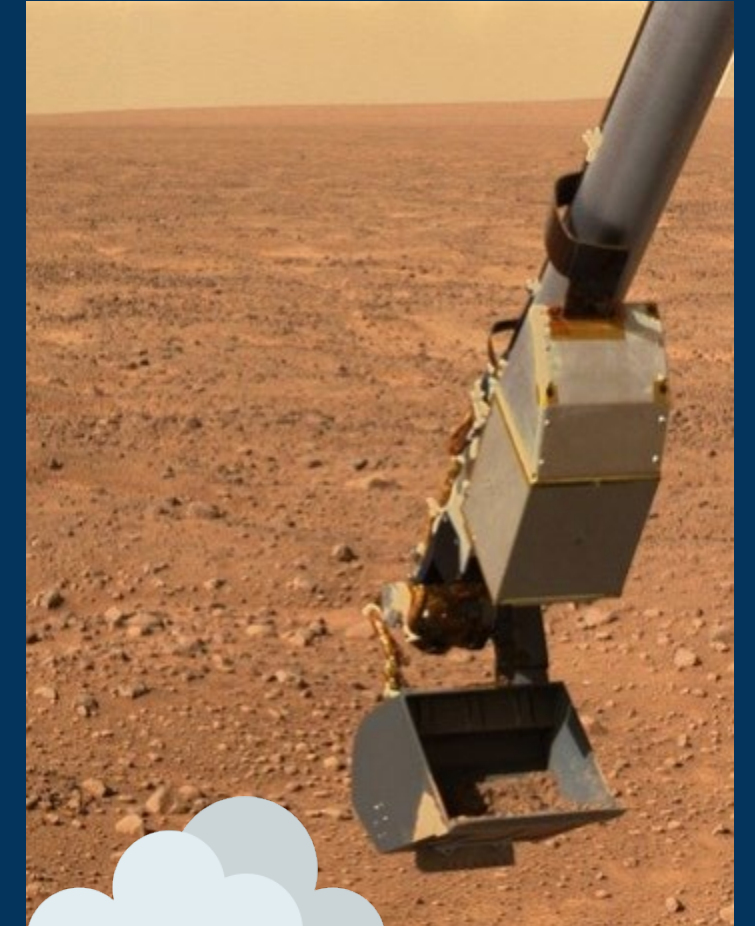
1

What effect does
salt have on the
freezing point of
water?



2

What is dry ice?
What is
permafrost?



3

How does the
chemistry on
Mars affect
habitability?