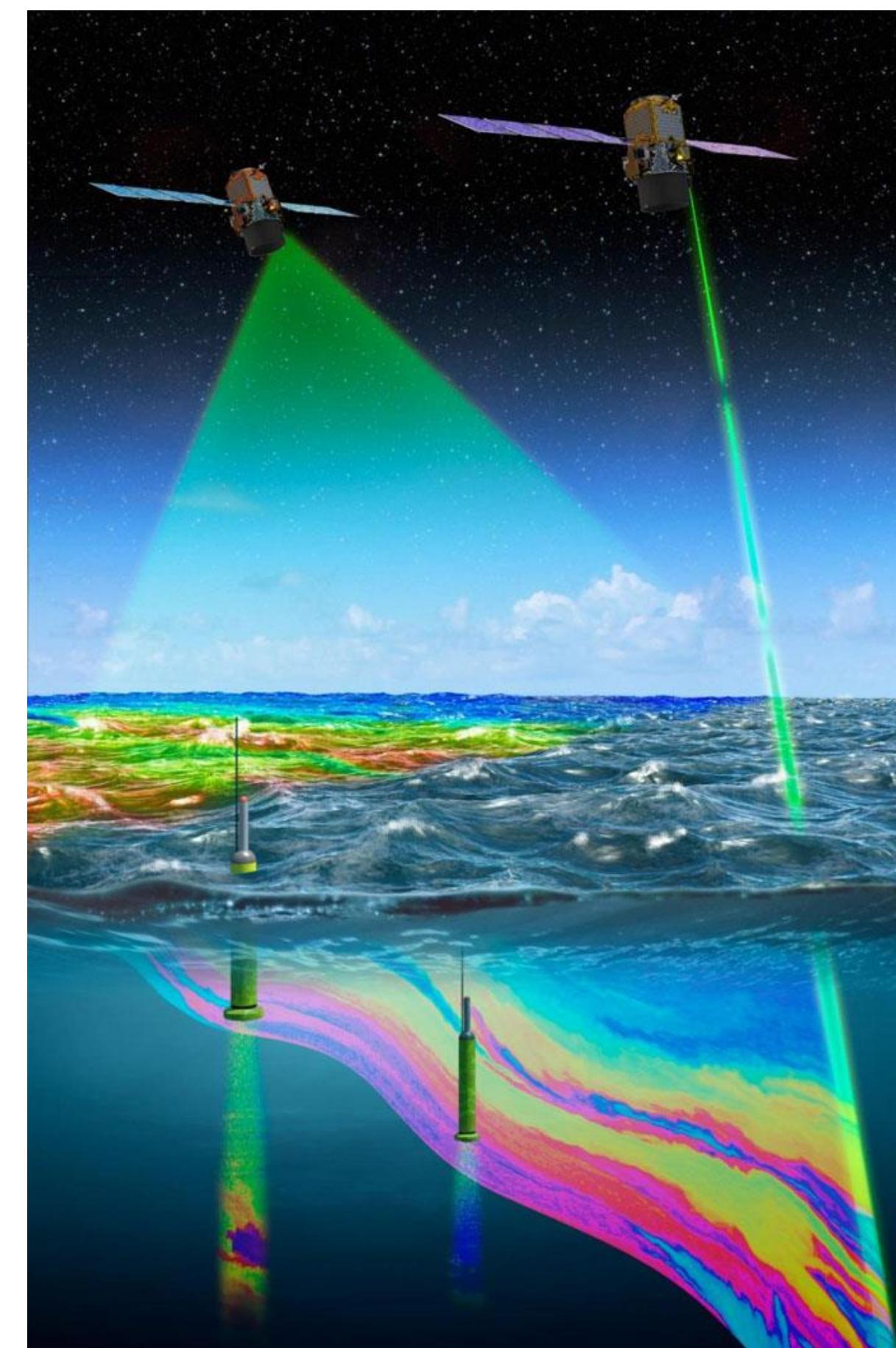


# Detection of Zooplankton on Europa

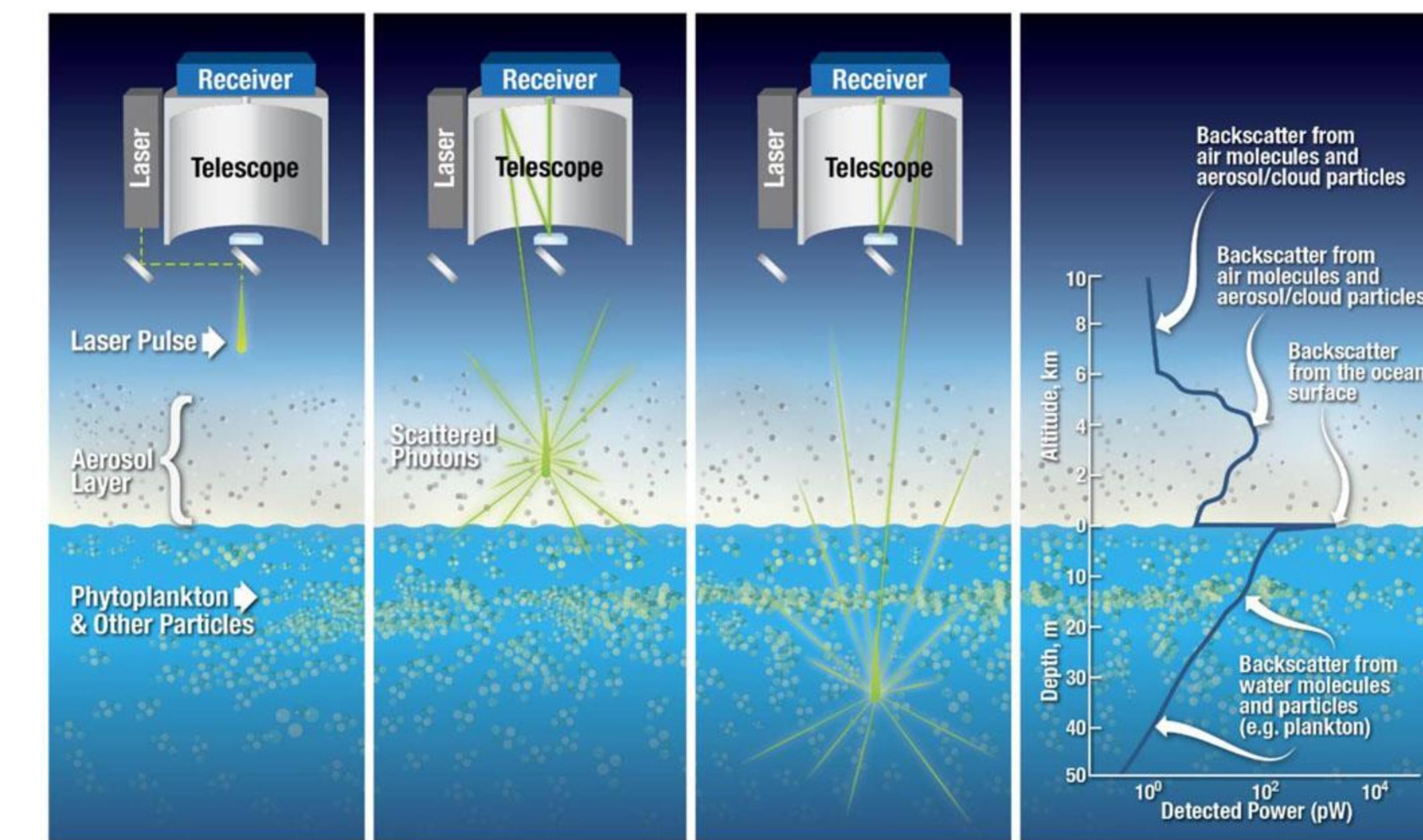
Frank Alas

## Introduction

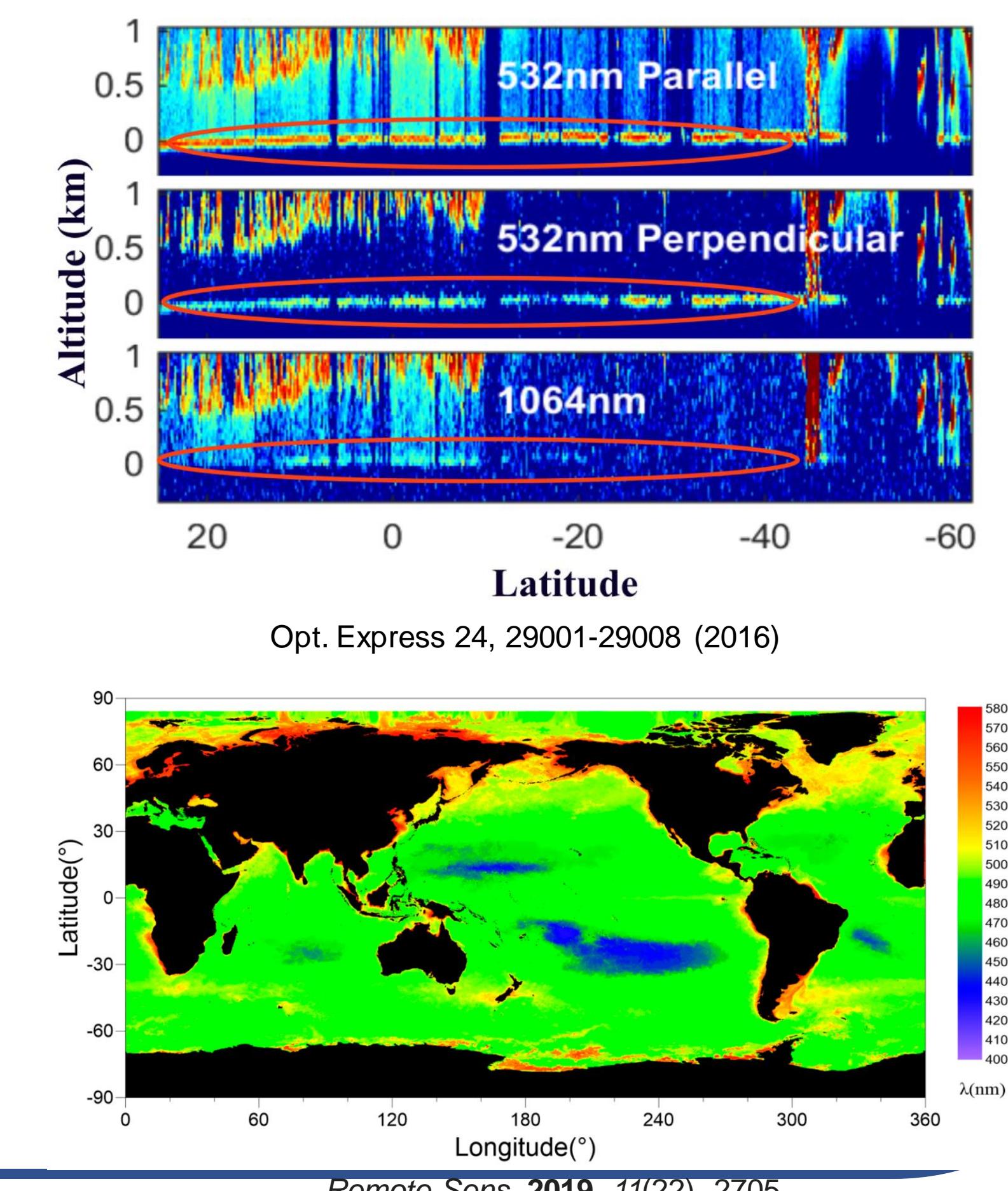
With over 224,000 discovered species, Earth's oceans house up to 80 percent of all life (19). It is estimated that Europa, one of the moons orbiting Jupiter, has roughly twice the amount of water found on Earth (19). Under its 15- 25 kilometers ice sheet, Europa has an ocean that is roughly 100 kilometers deep (1).



## LIDAR for Zooplankton Detection



Ann Rev Mar Sci. 2018 Jan 3; 10: 121–147

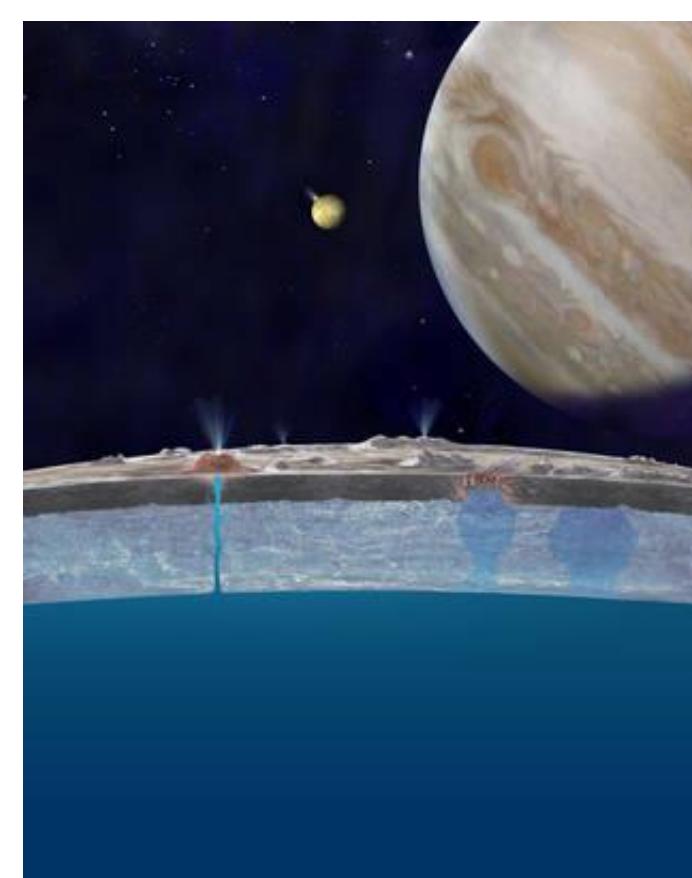


Opt. Express 24, 29001-29008 (2016)

Remote Sens. 2019, 11(22), 2705

## Why Europa?

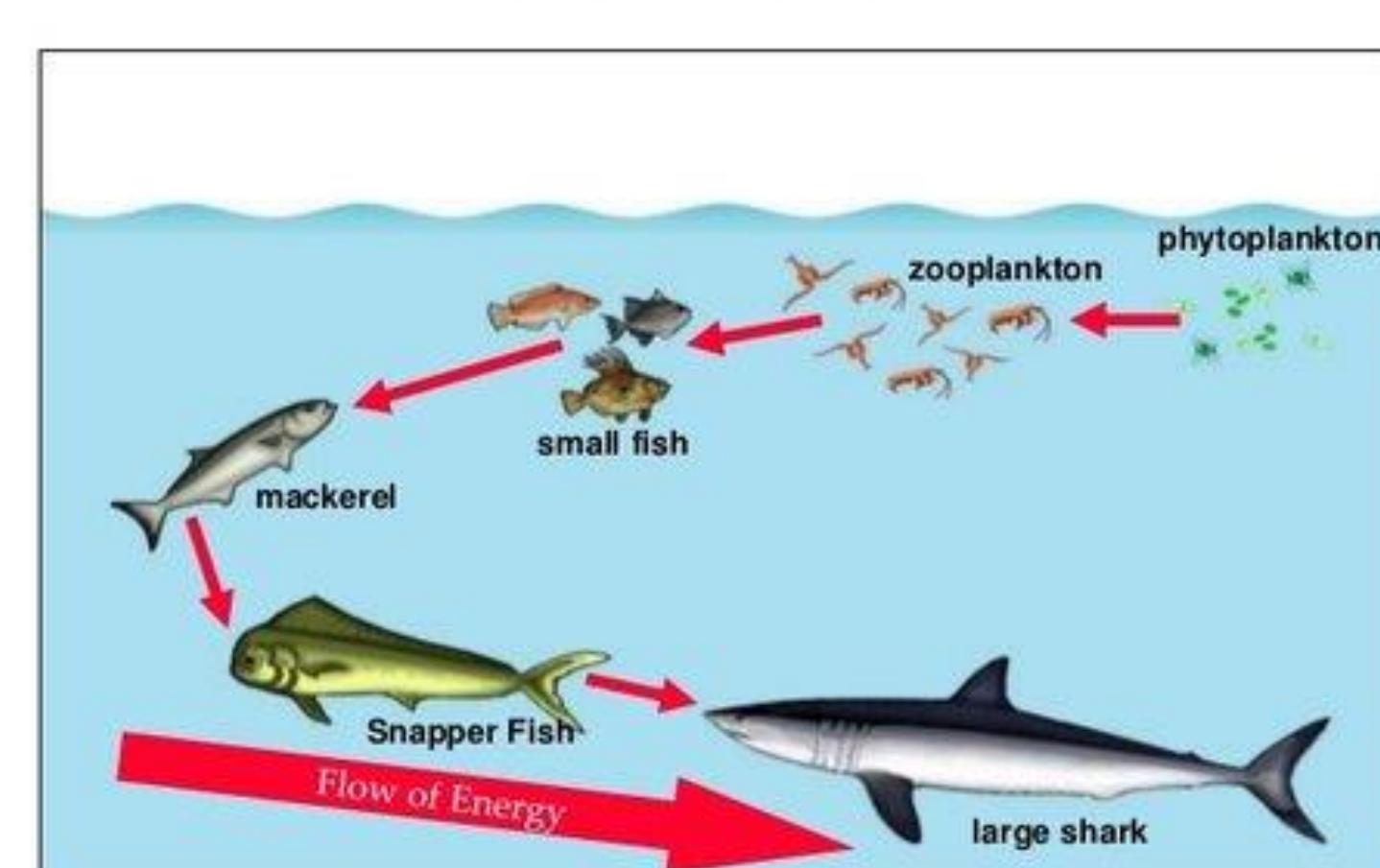
Exploring Europa may allow us to find life outside of Earth.



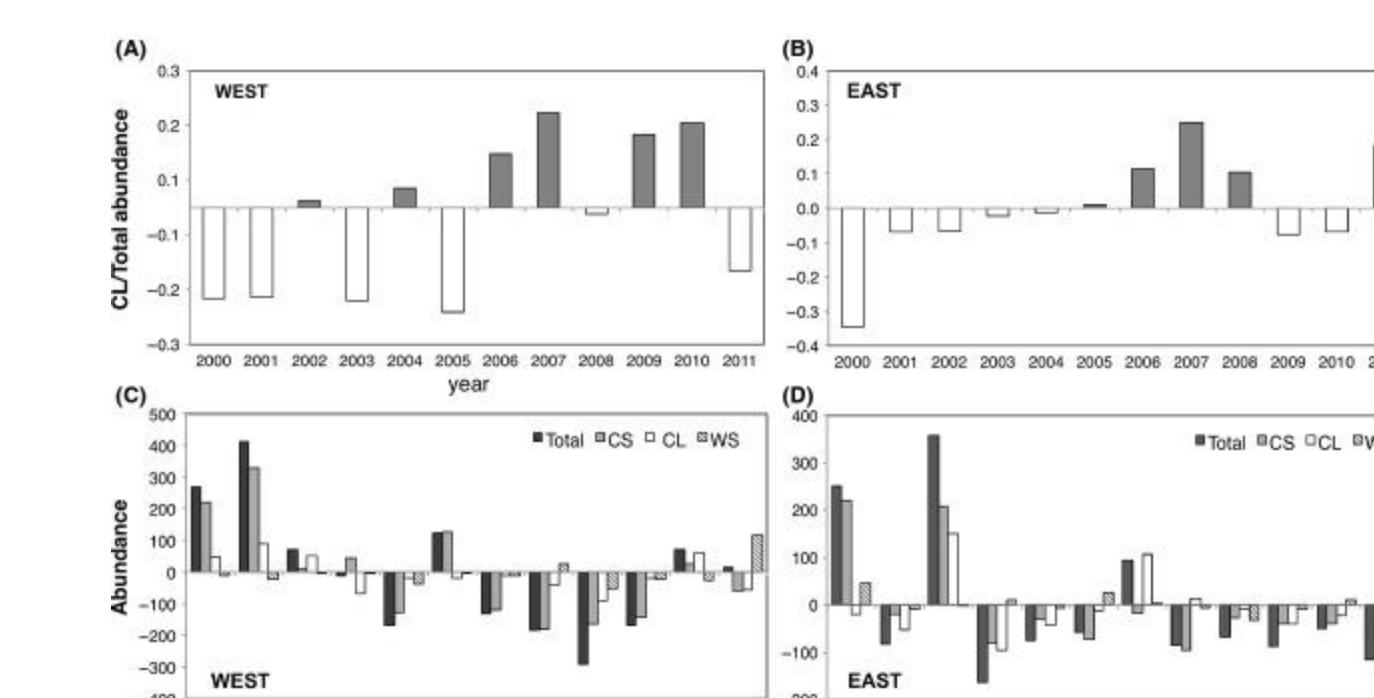
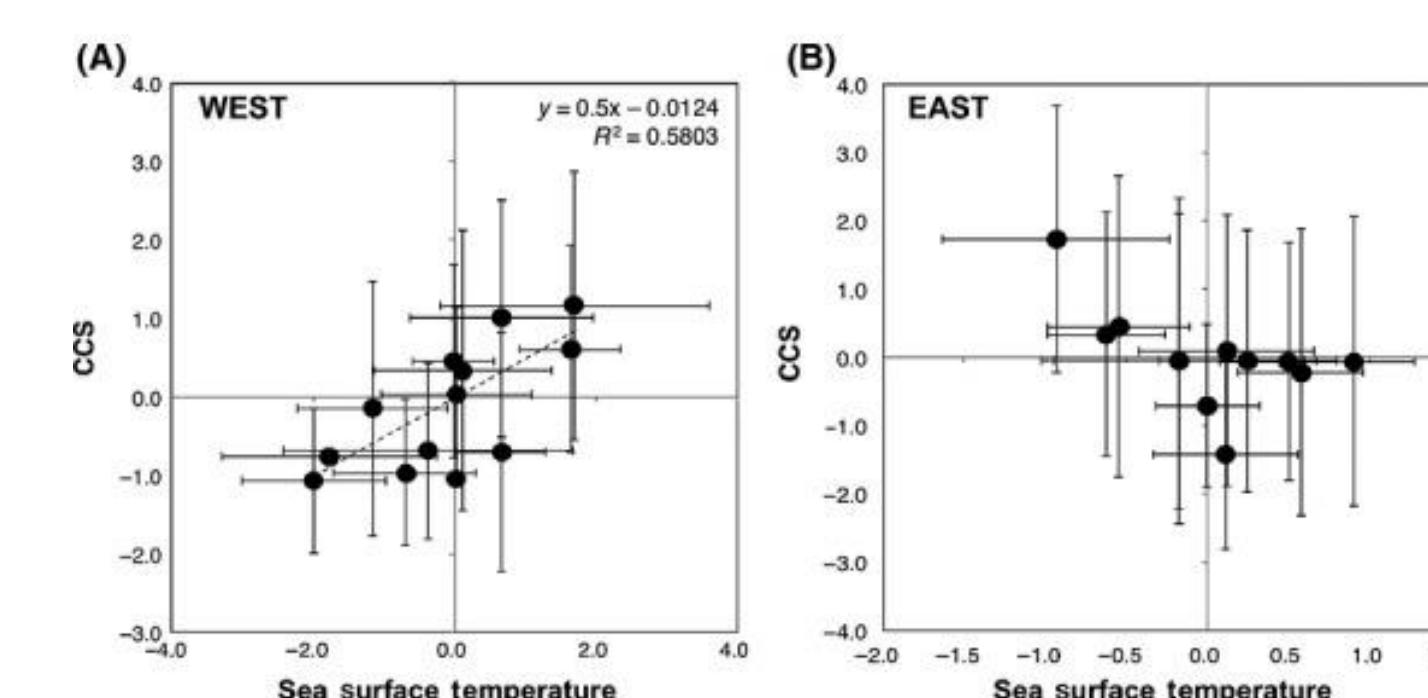
## Why Zooplankton?

Zooplankton play a vital ecosystem role and are an incredibly important food source for many of the marine wildlife due to their sheer abundance. The most prominent zooplankton, copepods, are the most abundant animals on Earth, outnumbering insects by possibly three orders of magnitude (10).

### Food Chain



## Effect of Temperature on Zooplankton Size



Ecol Evol. 2015 Feb; 5(4): 968–978

## Hypothesis

Plankton size correlates with the amount of nutrients which get mixed by the oceans, so if we find small plankton, that means the oceans aren't mixing much.

Based on the temperature of Europa's oceans, I hypothesize that plankton would be smaller than on Earth.

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