Icy Seas

Scientific Musings of a Sailor in a Changing Climate

HOME ABOUT

Arctic Ocean climate climate change continental shelves glaciers Greenland ice ice island moorings Nares Strait NASA oceanography Petermann physics weather

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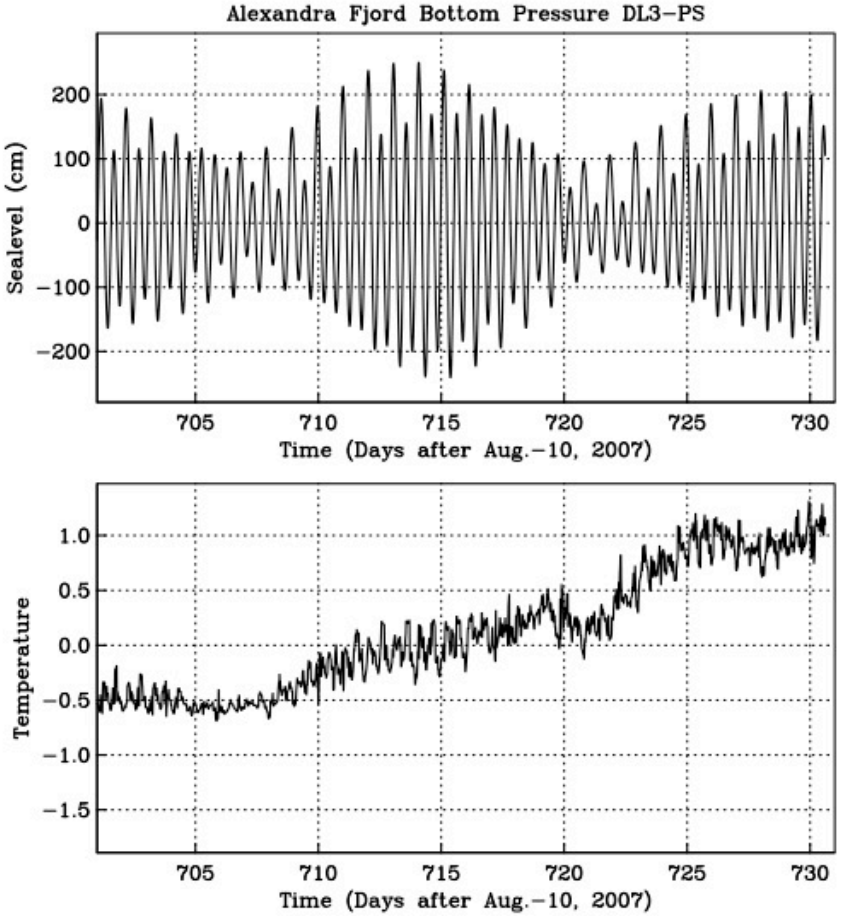
Def.: Time Series

Time series is a collection or sequence of numbers that represent the state of any system as a function of time or space or any other “ordering” independent variable.

Scalar Time Series Data



e.g., Sealevel Pressure

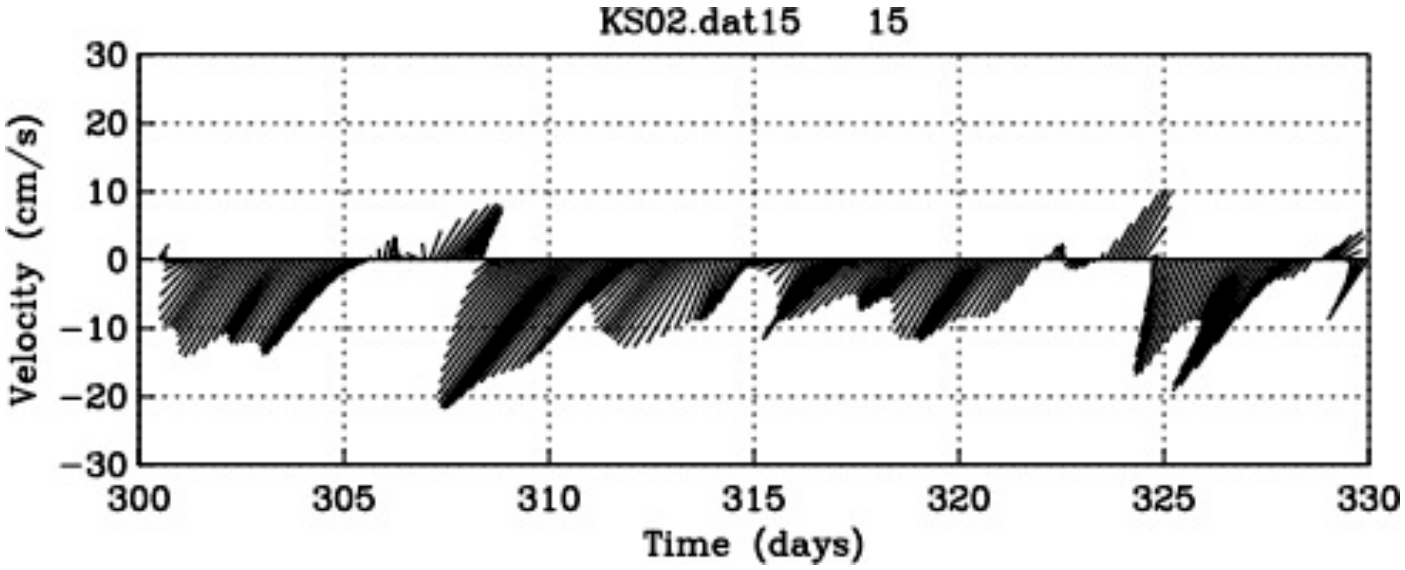
(almost periodic)

e.g., Bottom Temperature

(transient)

Vector Time Series Data

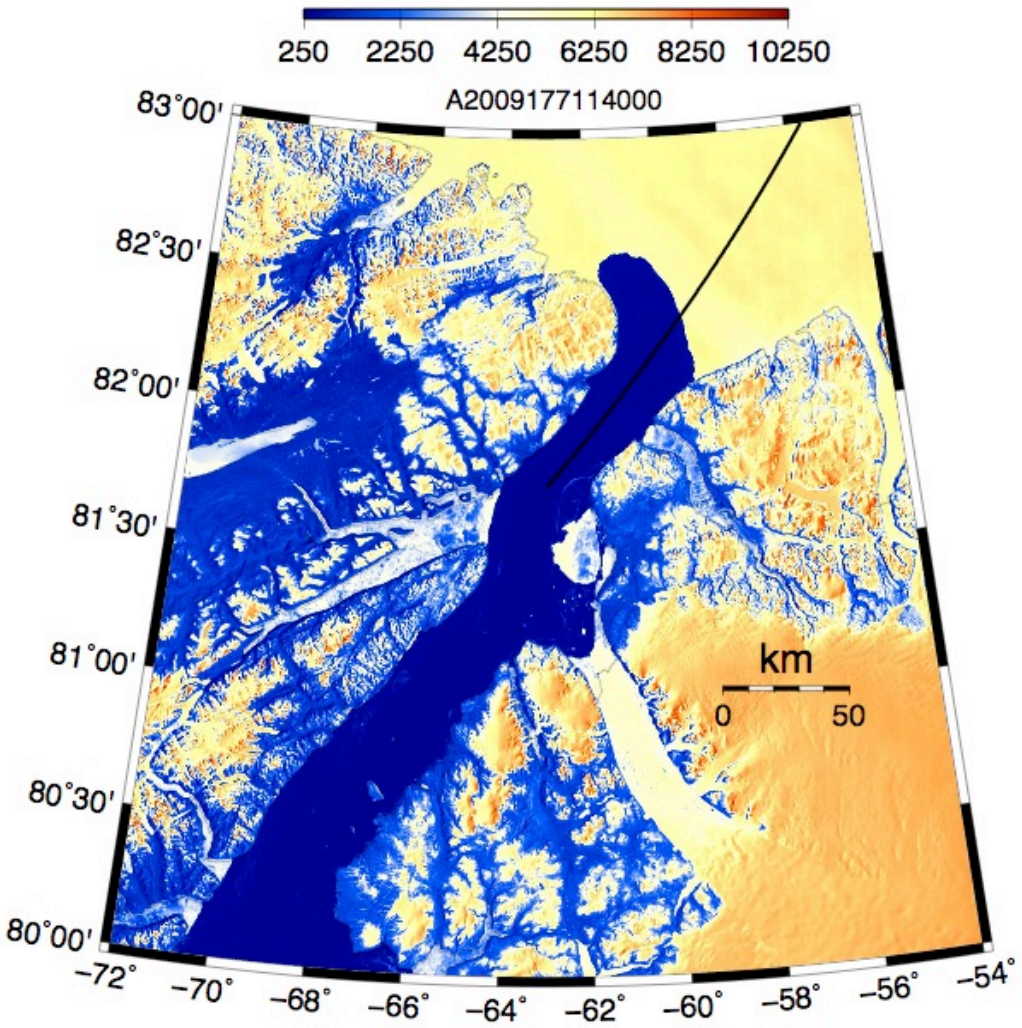
Ocean Currents



Speed (length of “stick”) and direction (orientation of “stick”)

as a function of time

Matrix Time Series Data



Spatial pattern of
"some scalar"

Reflectance at 645 nm
(red part of visible spectrum)
of ice, water, and land from MODIS

July-26, 2009 11:40 UTC

Matrix Time Series Data

Spatial patterns that vary with time

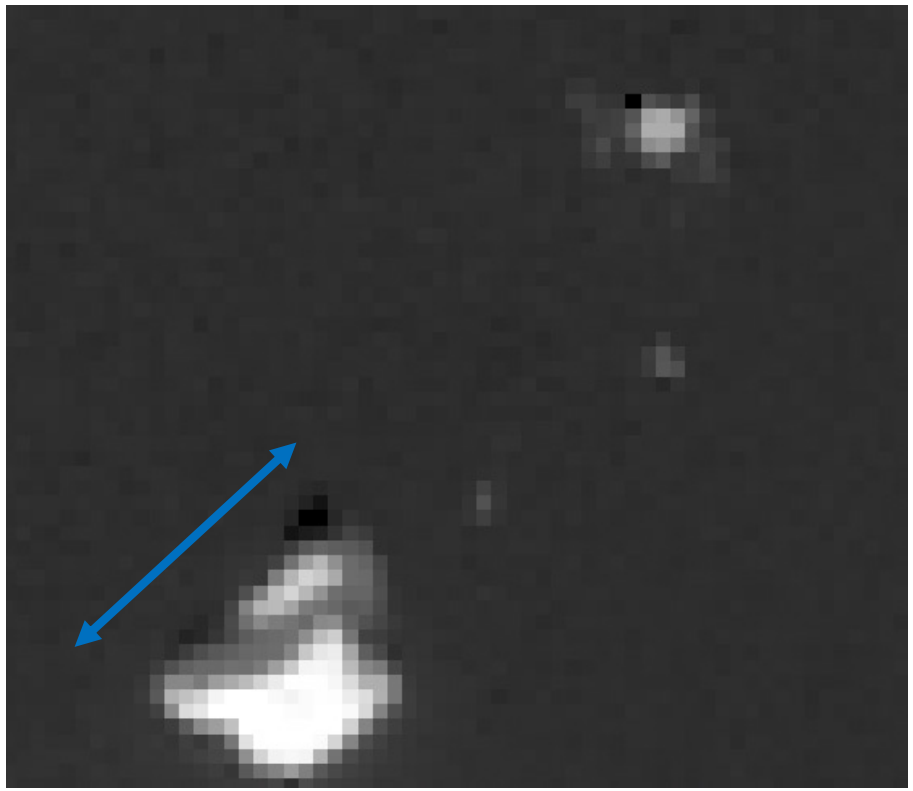
Show animation of
MODIS sea ice
Petermann fjord and glacier

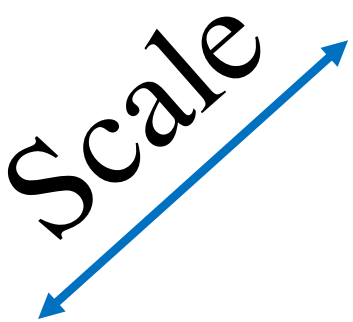
Mathematical Data

(continuous): $x=x(t)$

Digital Data

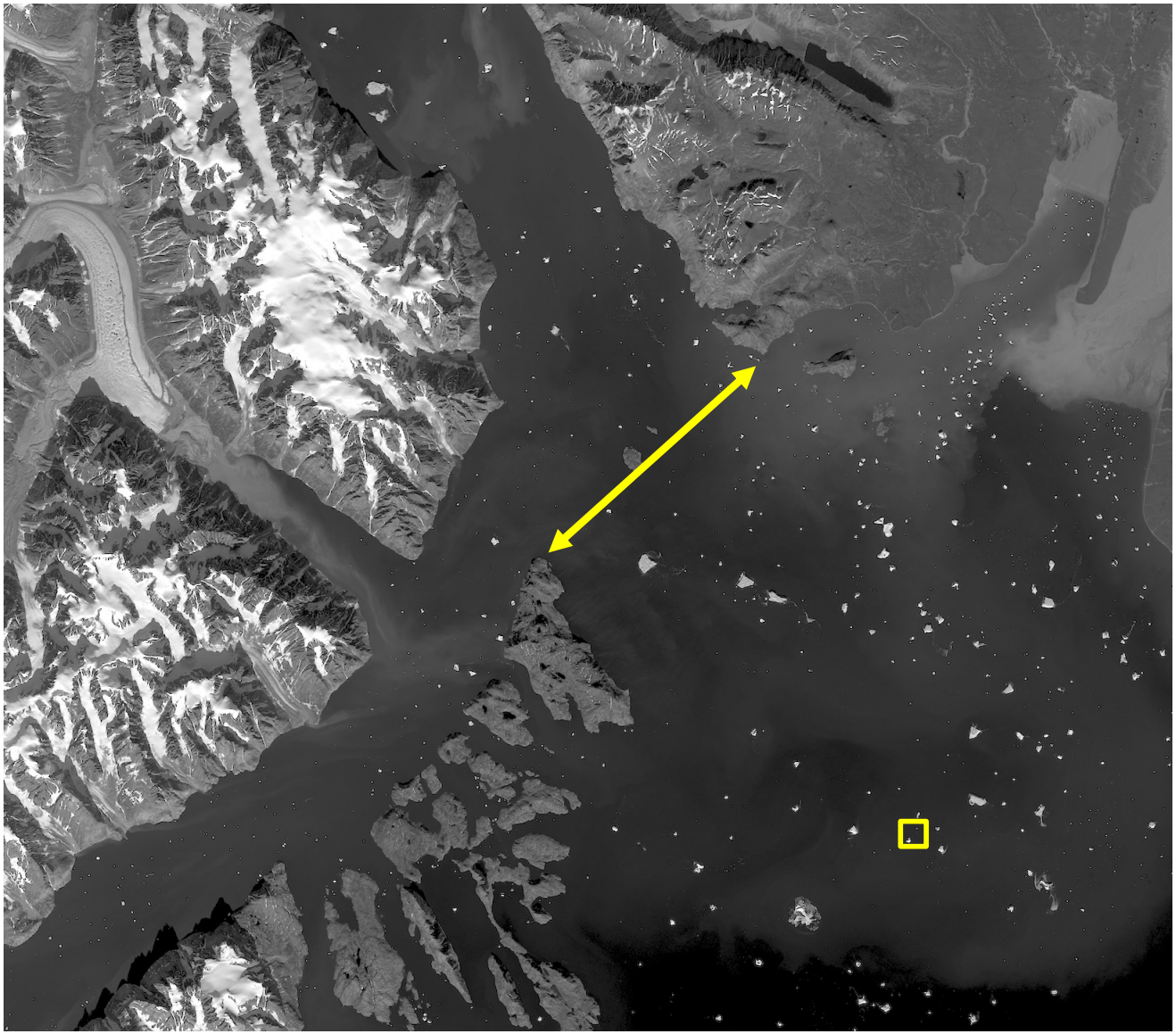
(discrete): $x = x(t_i) \quad i=1,2,3 \ldots N$



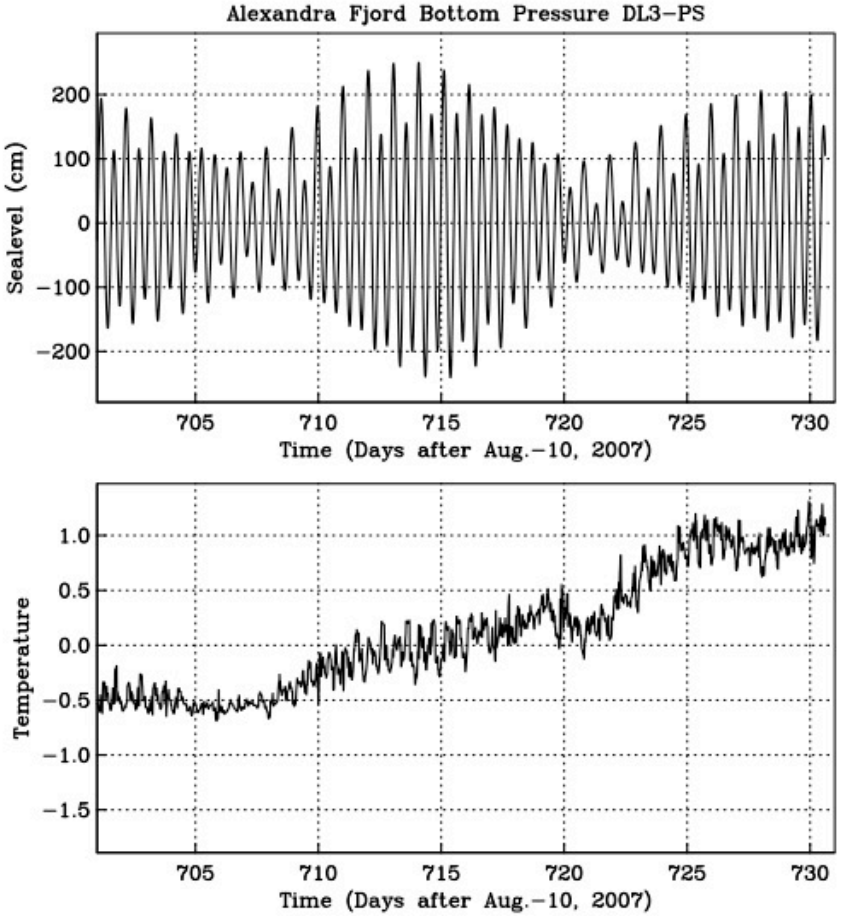


Scoresby Sund,
Greenland Aug. 2018

Water color with colored pencil
Dragonfly Leathrum, 2018



Scalar Time Series Data



Deterministic Data

can be predicted into the future

Example: Tides

Stochastic or Random Data

cannot be predicted into the future without stating probabilities

Example: Weather