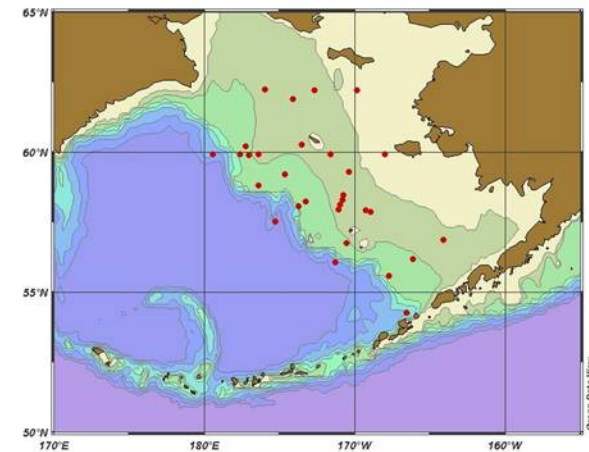
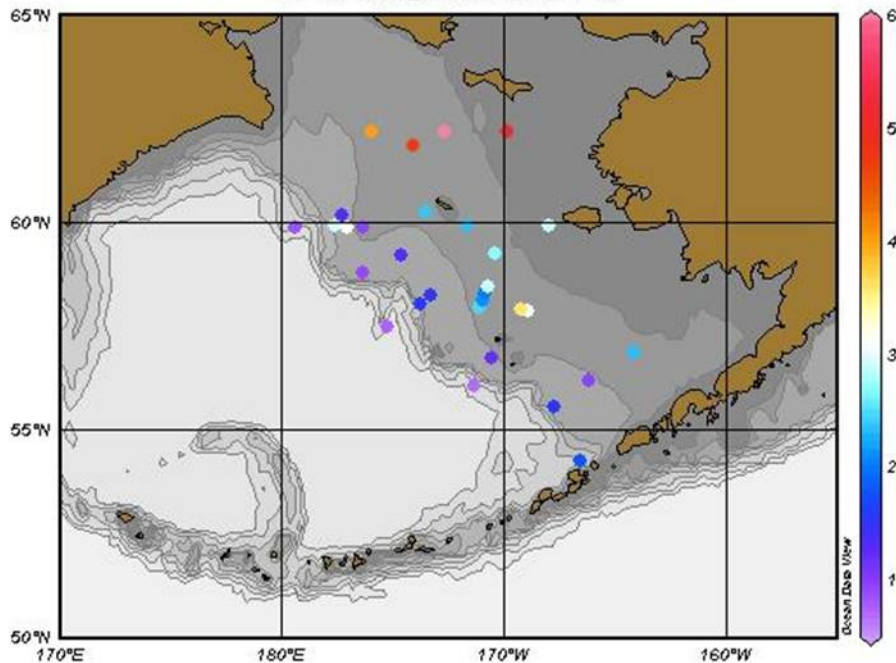


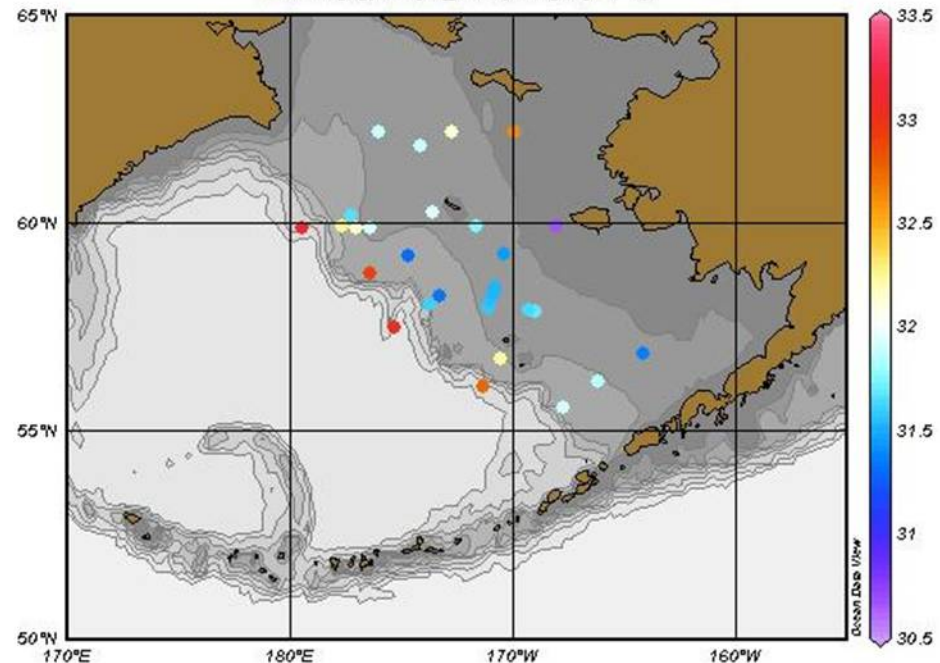
Station locations and surface water dissolved iron (DFe) distribution



DFe [nM] @ Depth [m]=Top

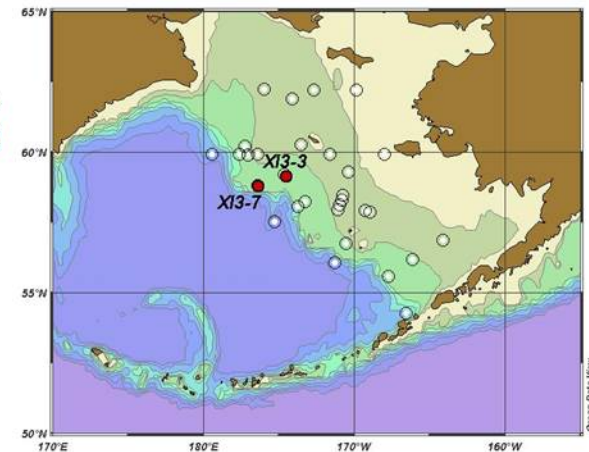
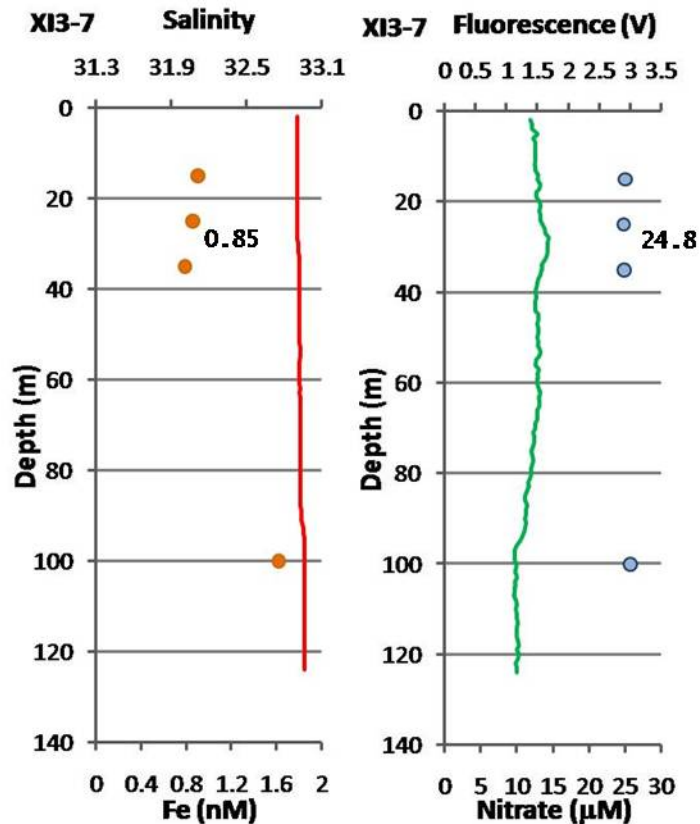


Salinity [psu] @ Depth [m]=Top



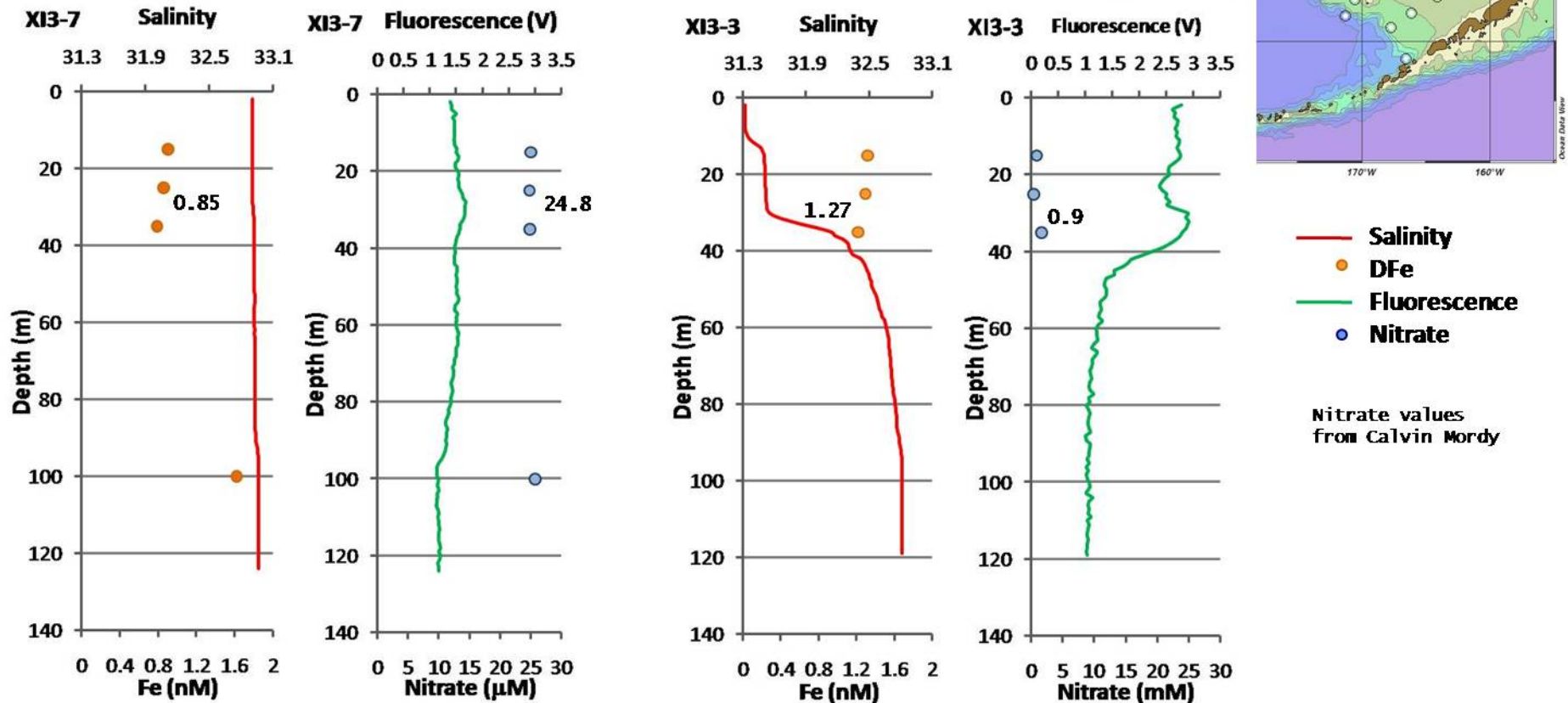
- Highest surface DFe in the north, and lowest values at the shelf break
- DFe decreased from east to west
- Higher DFe in spring compared to published summer values

The influence of sea ice melting on seawater DFe distributions

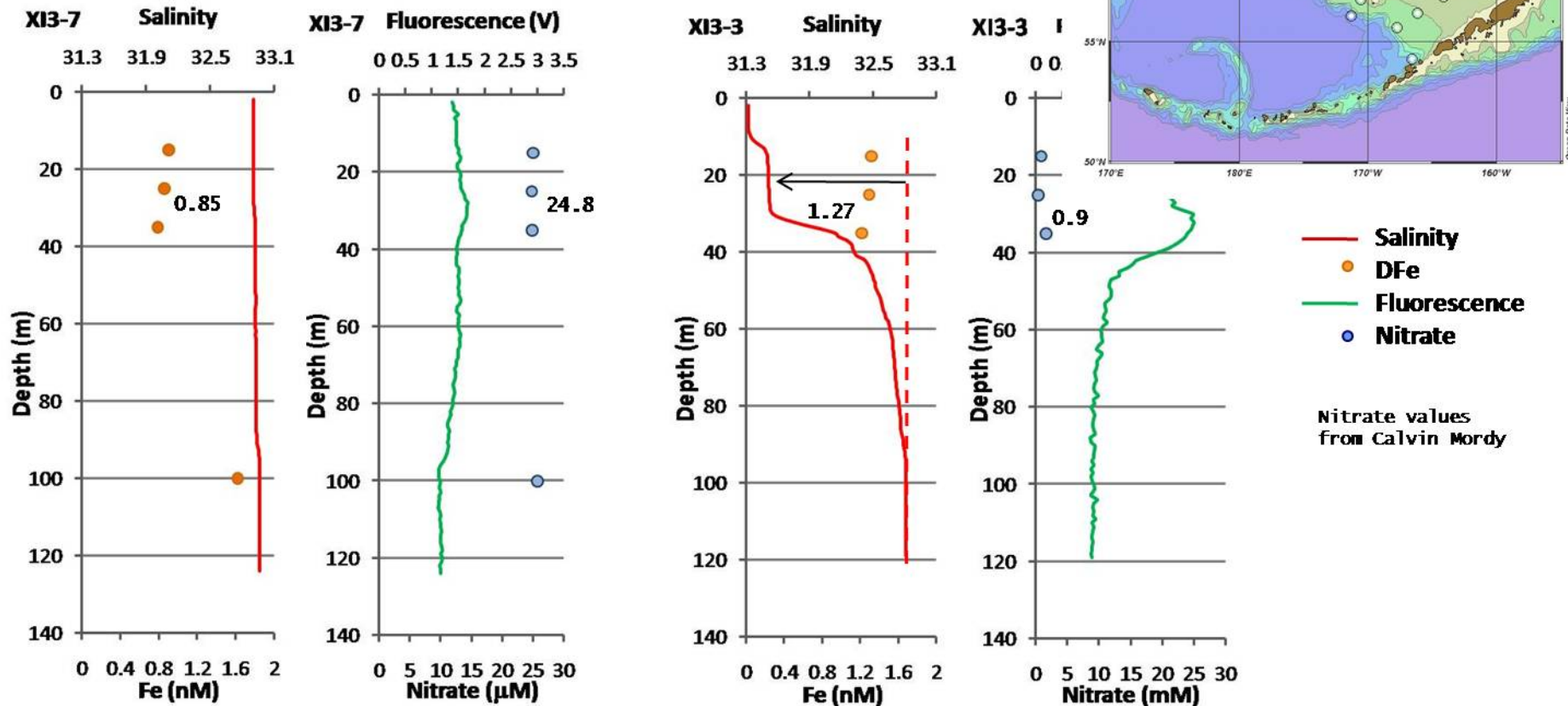


- Salinity
 - DFe
 - Fluorescence
 - Nitrate
- Nitrate values
from Calvin Mordy

The influence of sea ice melting on seawater DFe distributions

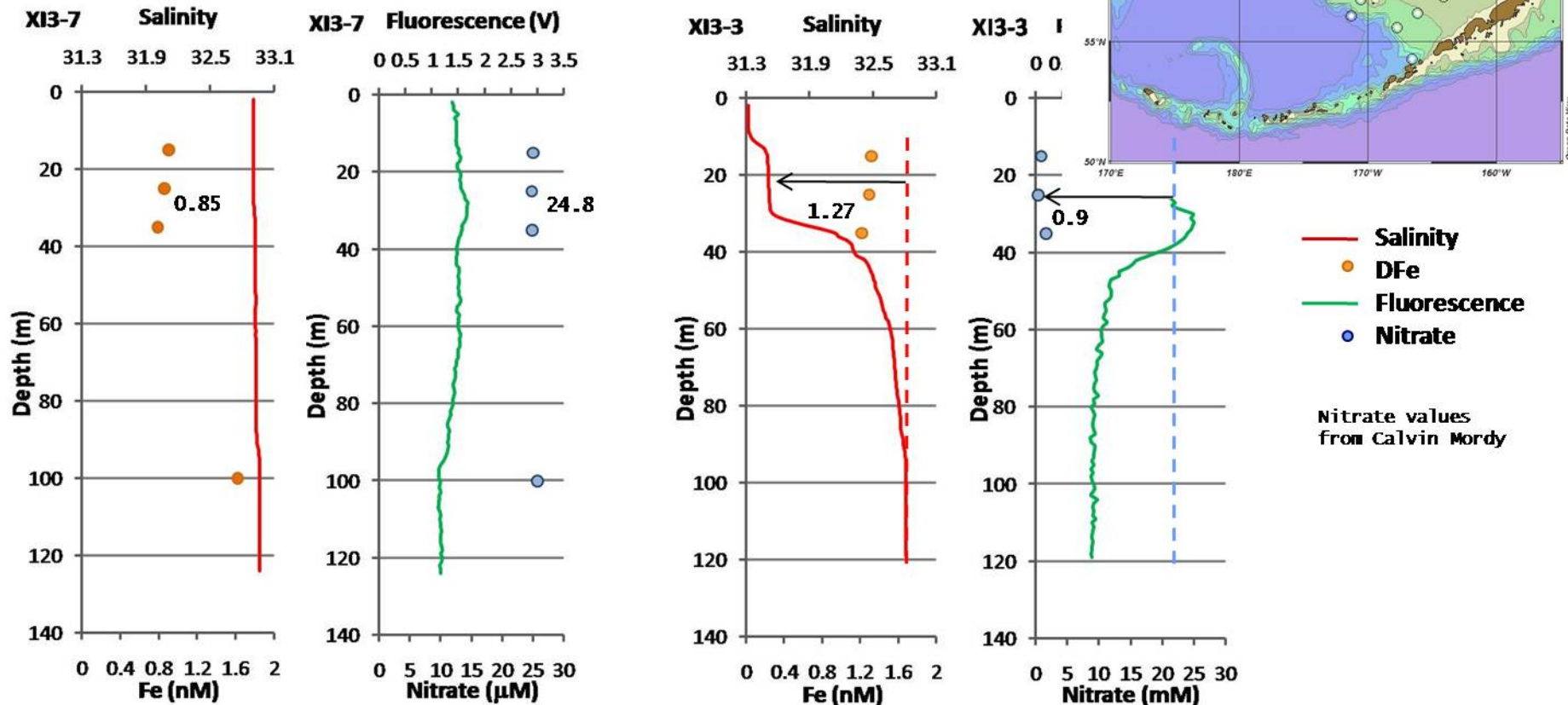


The influence of sea ice melting on seawater DFe distributions



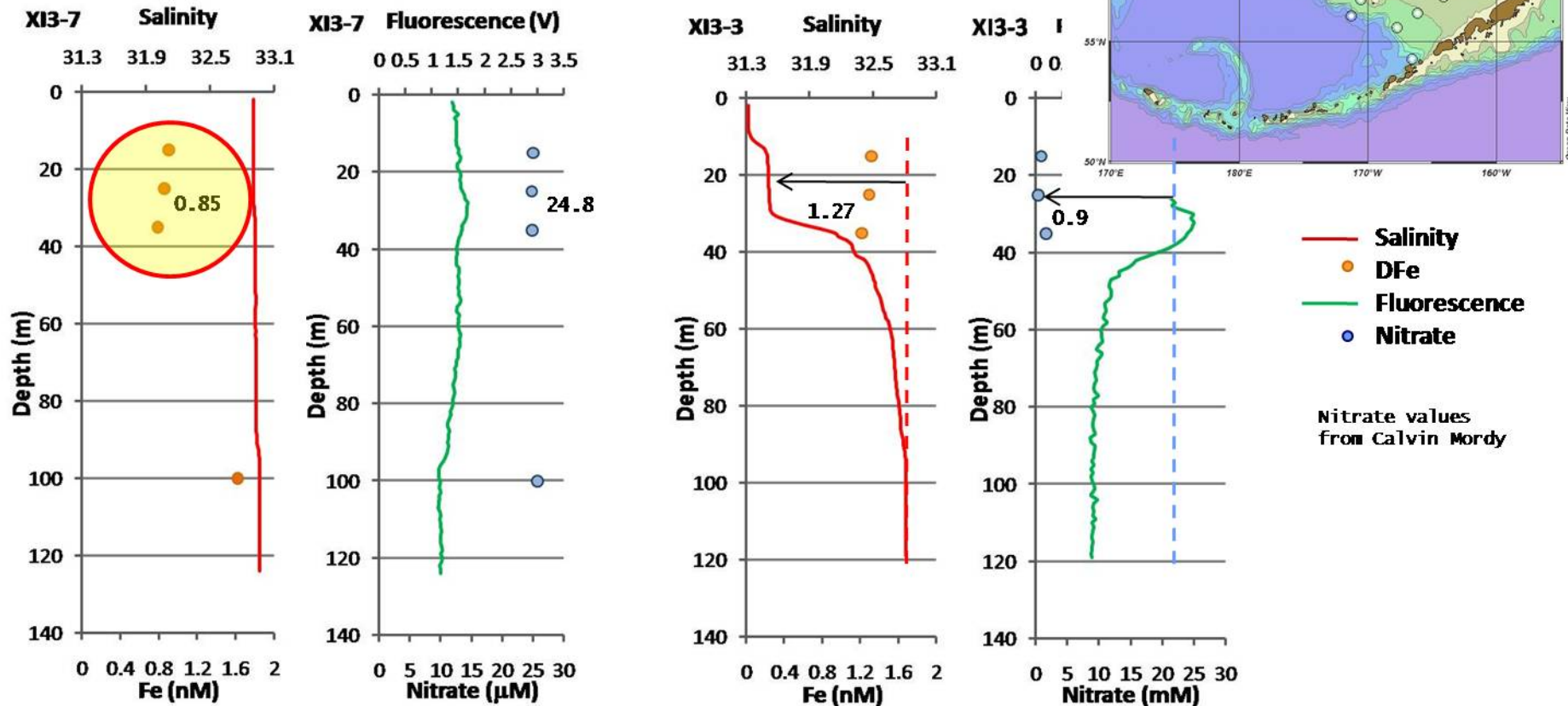
• A mixture of 1:20 melted ice:seawater (with sea ice salinity of 3-6)

The influence of sea ice melting on seawater DFe distributions



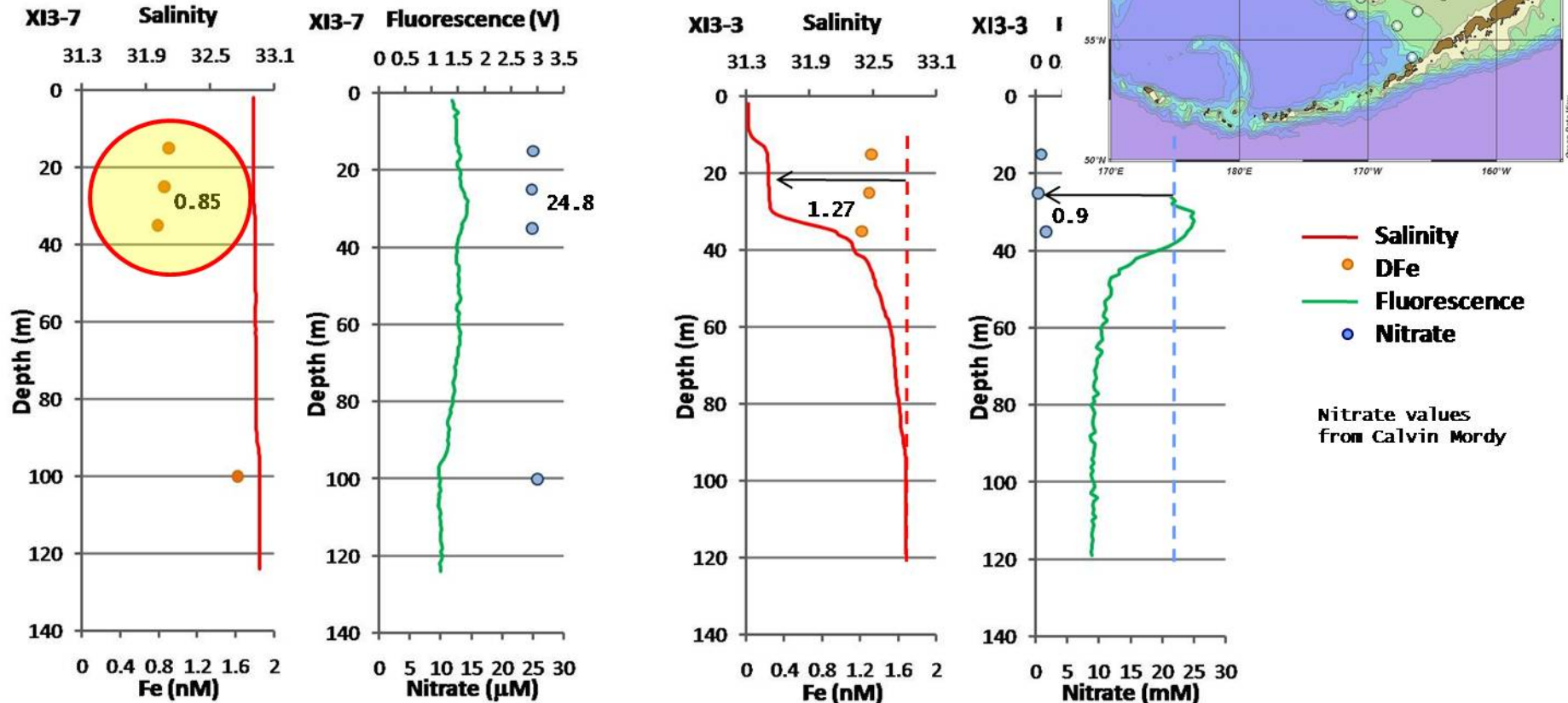
- A mixture of 1:20 melted ice:seawater (with sea ice salinity of 3-6)
- Using $\text{Fe:C} = 20 \mu\text{mol:mol}$, $\sim 3 \text{ nM Fe}$ are needed to draw down $\sim 23 \mu\text{M}$ nitrate

The influence of sea ice melting on seawater DFe distributions



- A mixture of 1:20 melted ice:seawater (with sea ice salinity of 3-6)
- Using $\text{Fe:C} = 20 \mu\text{mol:mol}$, $\sim 3 \text{ nM Fe}$ are needed to draw down $\sim 23 \mu\text{M}$ nitrate
- NOT ENOUGH Fe to accompany nitrate without supply from ice melt

The influence of sea ice melting on seawater DFe distributions



- A mixture of 1:20 melted ice:seawater (with sea ice salinity of 3-6)
- Using Fe:C = 20 μmol:mol, ~3 nM Fe are needed to draw down ~23 μM nitrate
- NOT ENOUGH Fe to accompany nitrate without supply from ice melt
- If DFe in seawater was ~ 4nM prior to draw down, then the contribution from ice melt was ~50 nM.

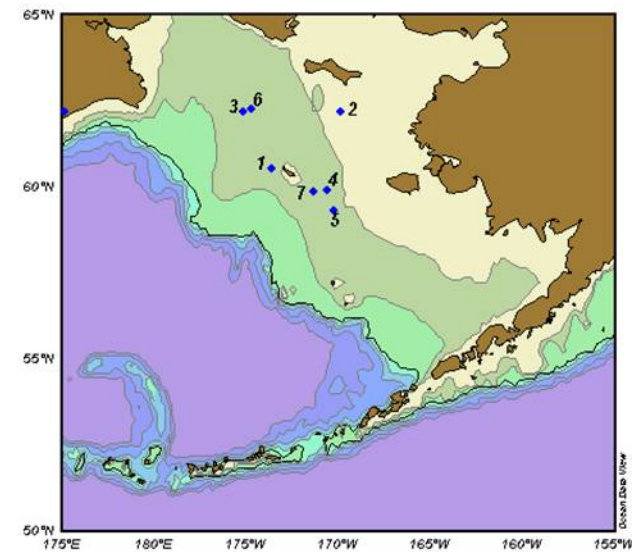
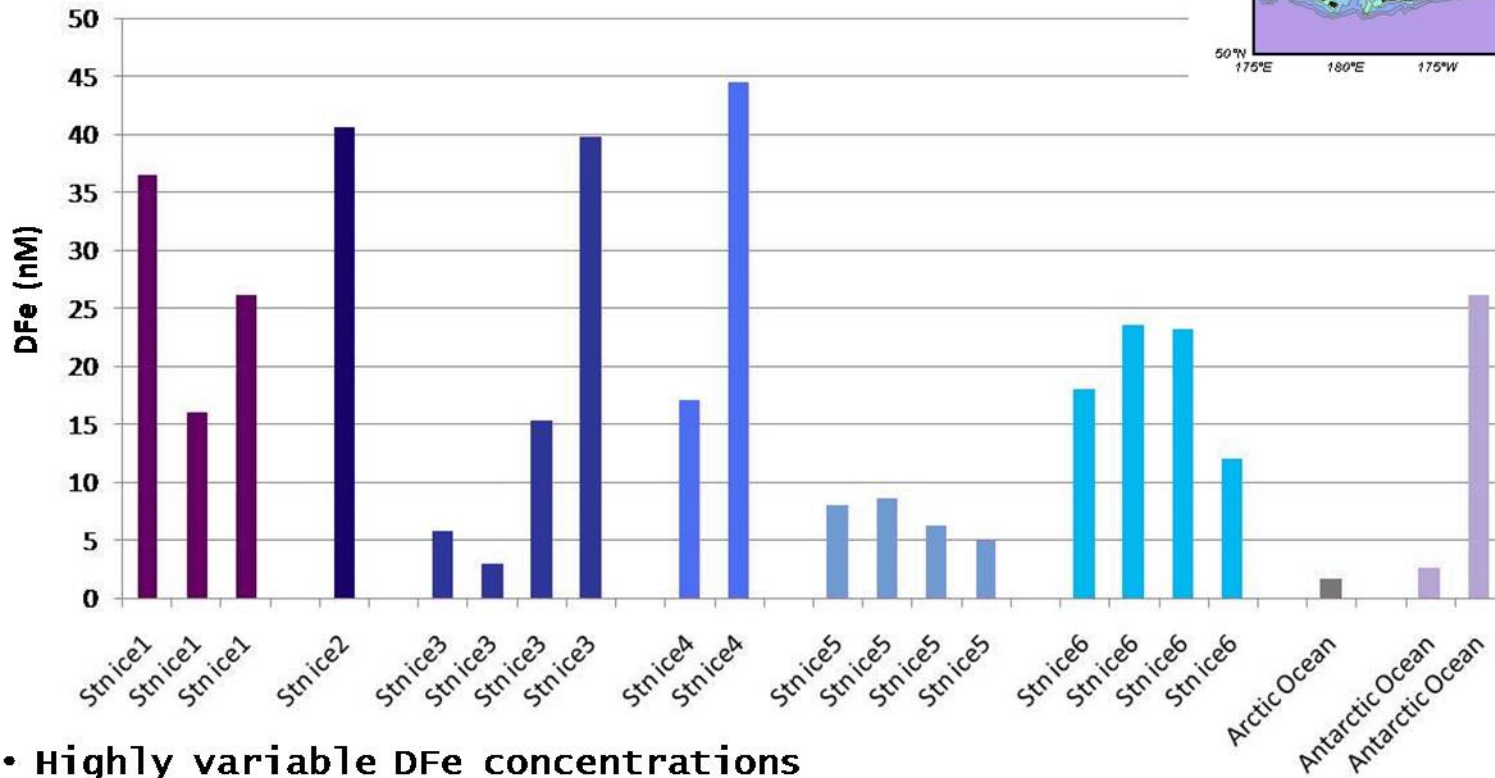
Dissolved iron concentrations in sea ice

Fe in water column prior to uptake

4 nM
3 nM
2 nM

Fe needed in sea ice if 1:20 mixture

50 nM
35 nM
20 nM



Antarctic Ocean values from Lannuzel et al., 2007

- Highly variable DFe concentrations
- Less variability between ice cores on later dates
- Particulate iron concentrations 1-2 orders of magnitude higher