TEMPORAL VARIABILITY OF NITRATE IN THE EASTERN CHUKCHI SEA

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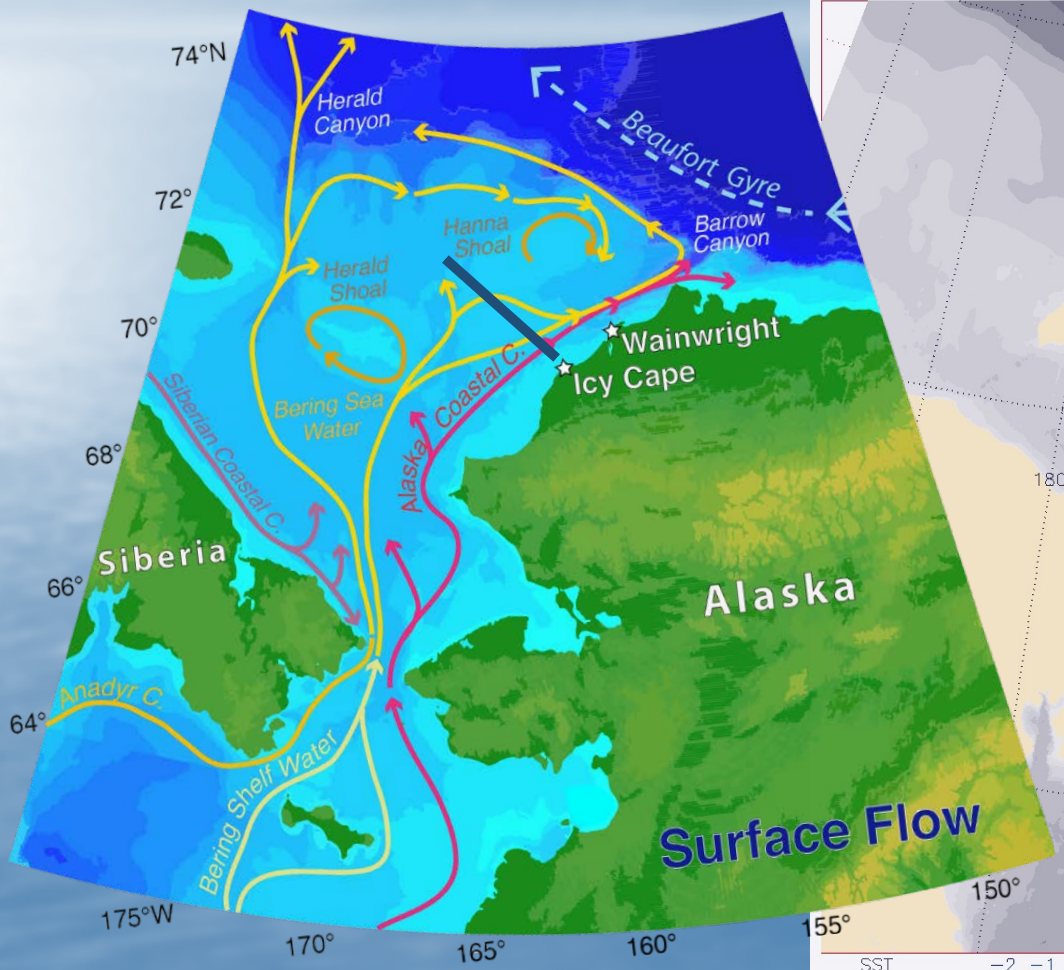
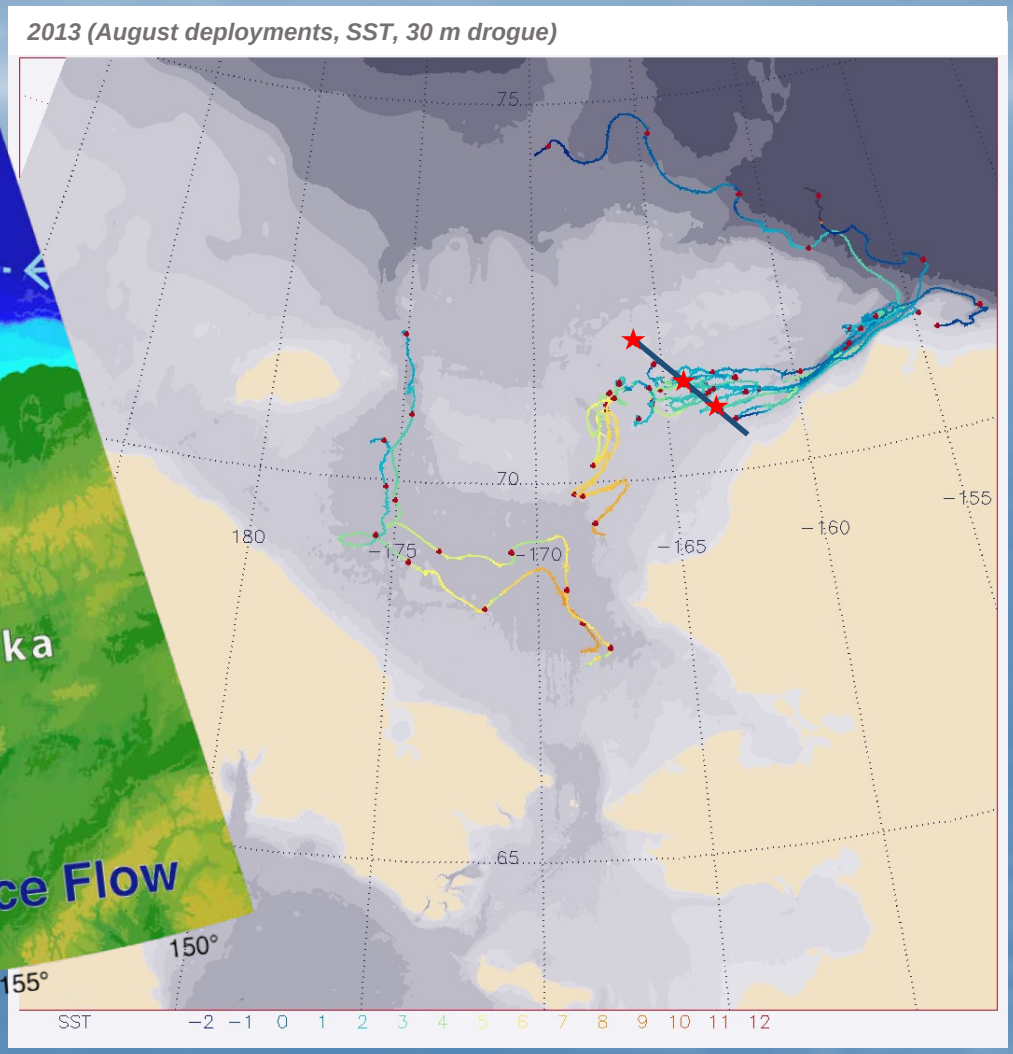
DRIFTER TRAJECTORIES - 2013





TIME SERIES – C2 MOORING

CHLOROPHYLL

OXYGEN

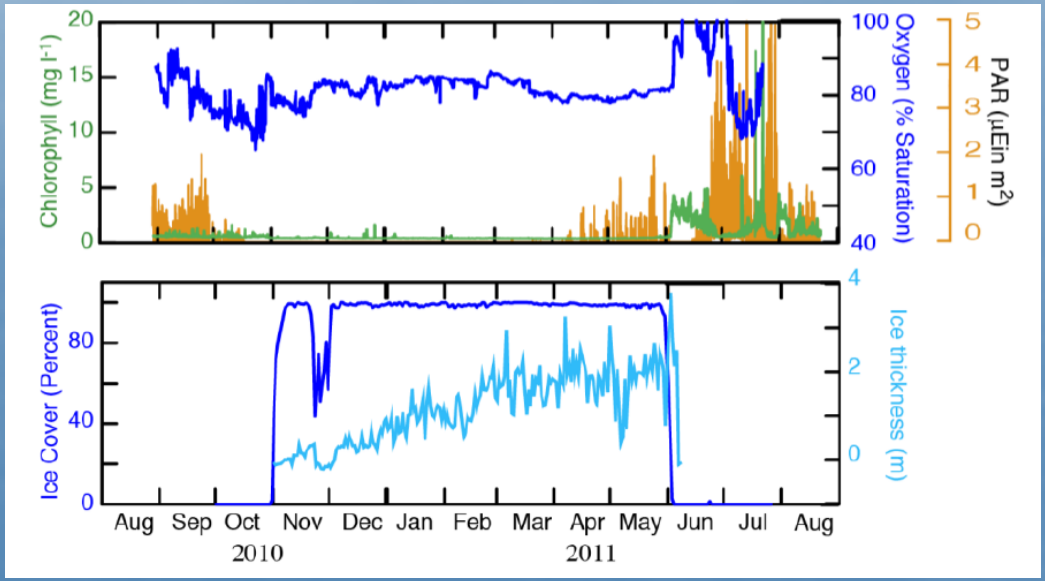
PAR

PAR (39 m)

- Measureable prior to ice retreat
- Absent in early June

CHL and O_2 (39 m)

- Initial increase with ice retreat
- Undersaturated O_2 thereafter

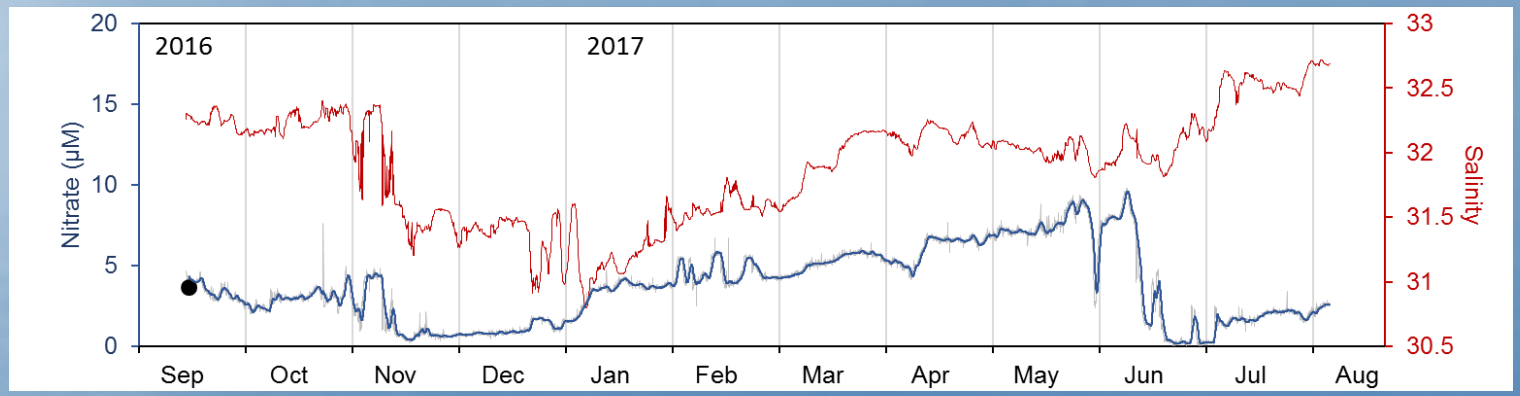


What are the sources of nitrate to support these blooms?

C1


2016
2017
Nitrate (µM)
Salinity
0
5
10
15
20
30.5
31
31.5
32
32.5
33
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

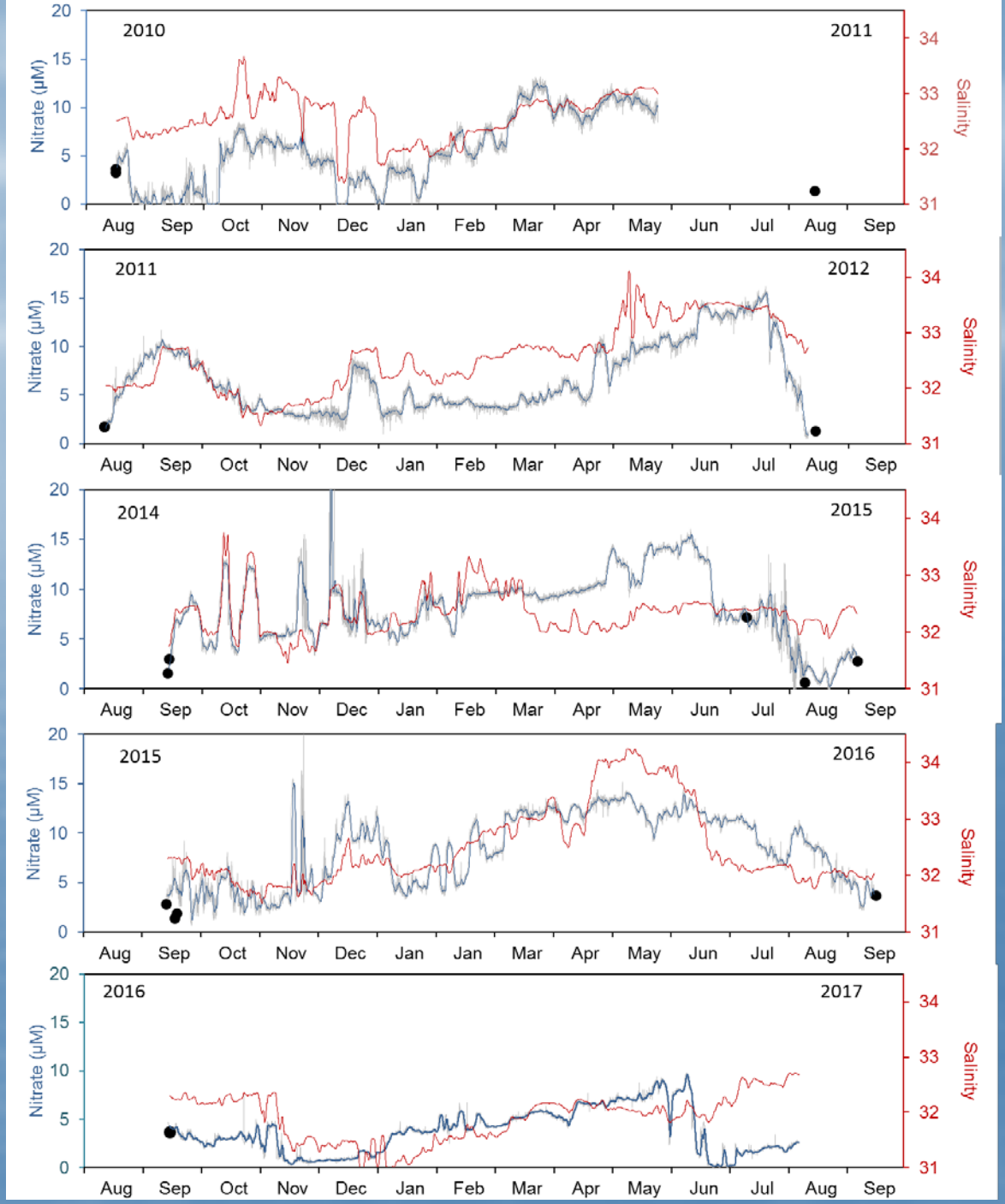
C2


2016
2017
Nitrate (µM)
Salinity
0
5
10
15
20
30.5
31
31.5
32
32.5
33
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

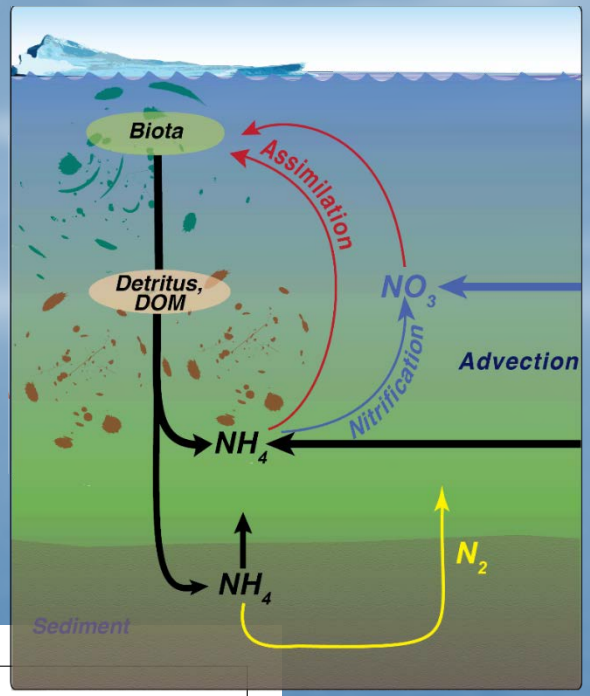
C3

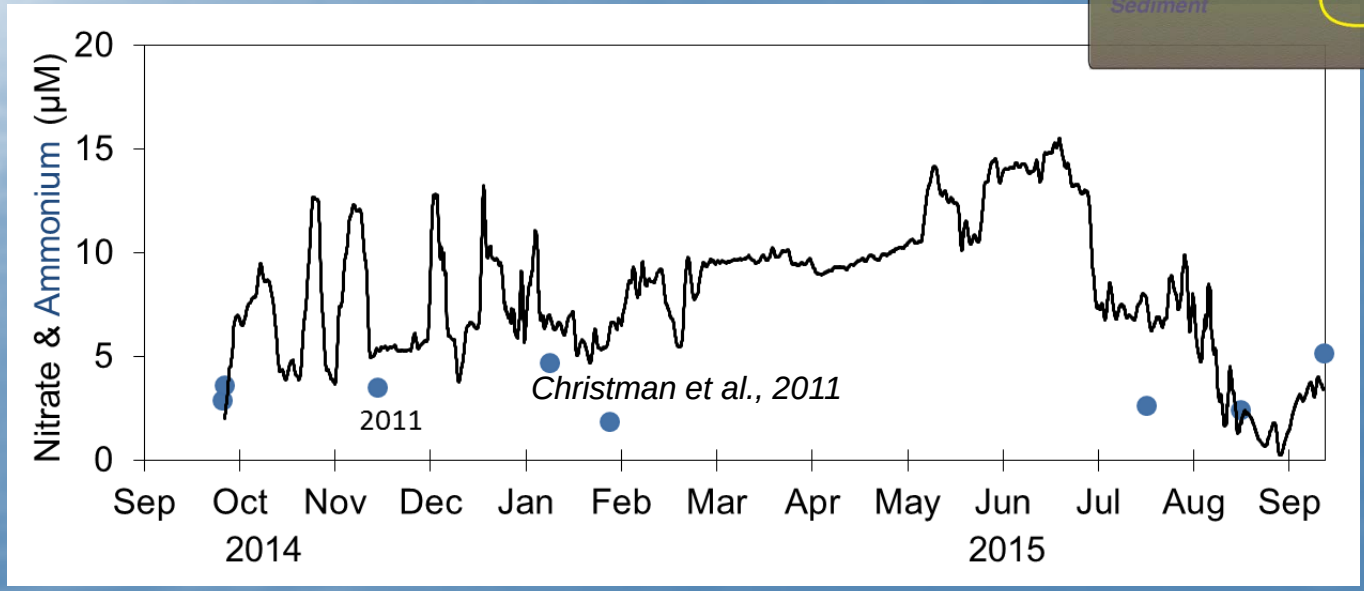

2016
2017
Nitrate (µM)
Salinity
0
5
10
15
20
30.5
31
31.5
32
32.5
33
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

C2


2010
2011
2012
2014
2015
2016
2017
Nitrate (µM)
Salinity
0
5
10
15
20
31
32
33
34
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep

NITRIFICATION





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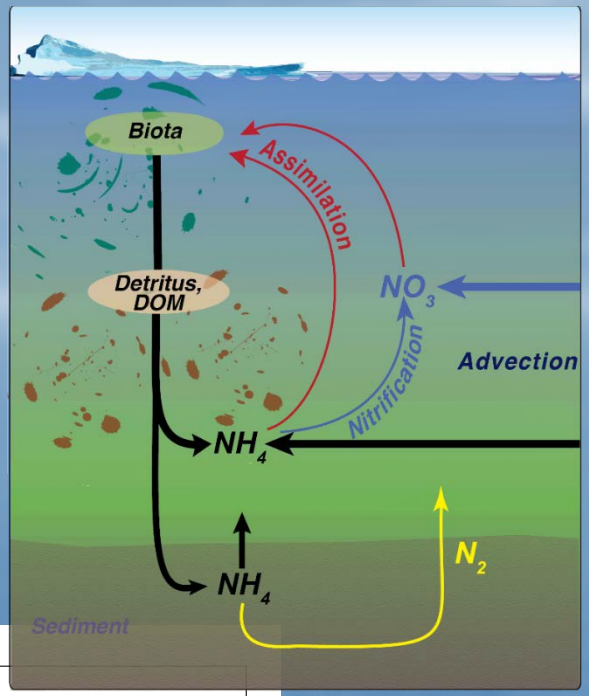
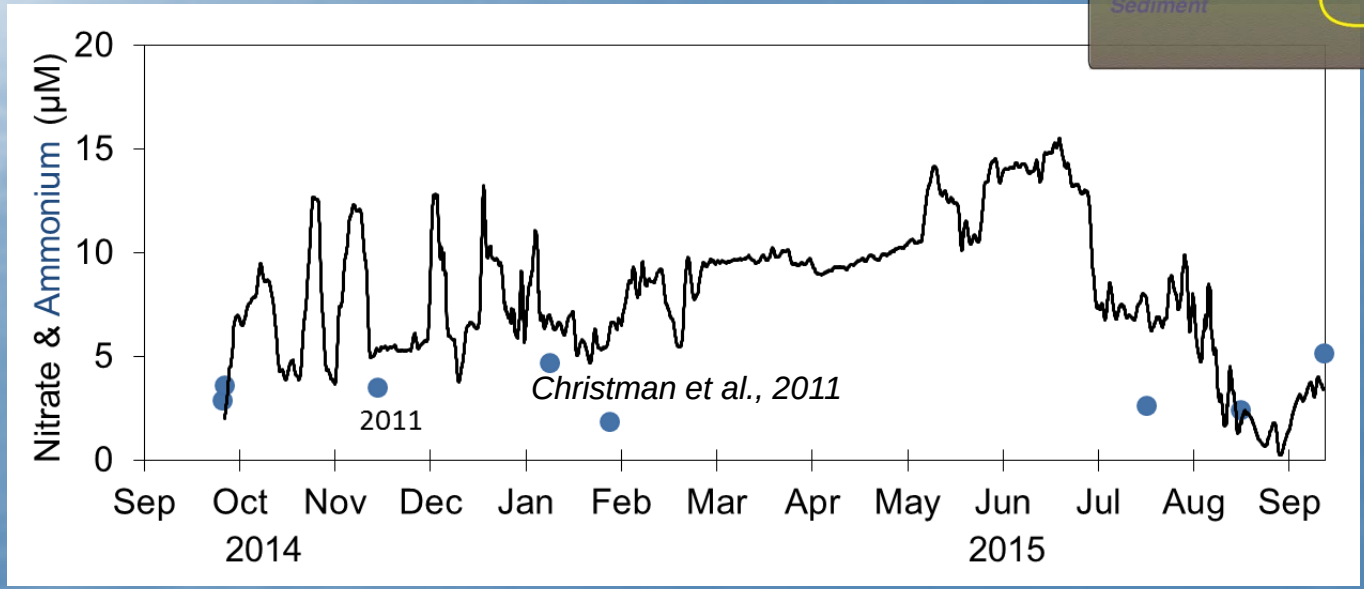
NITRIFICATION

"Potential nitrification rates…were highest in the winter when competition with phytoplankton was minimal and ammonium concentrations were the highest."

Christman et al., 2011





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SUMMARY

ICY CAPE LINE / MOORINGS

- High interannual variability in transport in winter
- Transport is ~40% of Bering Strait flow

CARBON EXPORT

- Two patterns of phytoplankton blooms in eastern Chukchi
- Source of ammonium for nitrification

NITRATE REPLENISHMENT

- Advection – large interannual variability
- Nitrification – supported by substantial export of organic matter