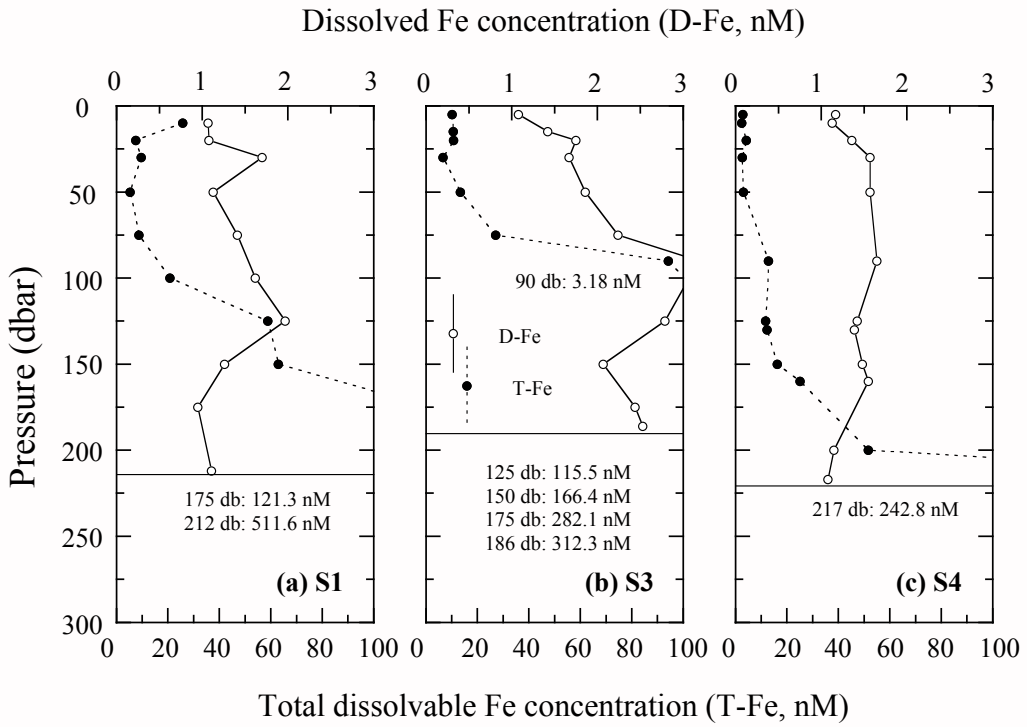
Vertical distributions of D-Fe and T-Fe concentrations in the water column of the shelf region

Fig. 9

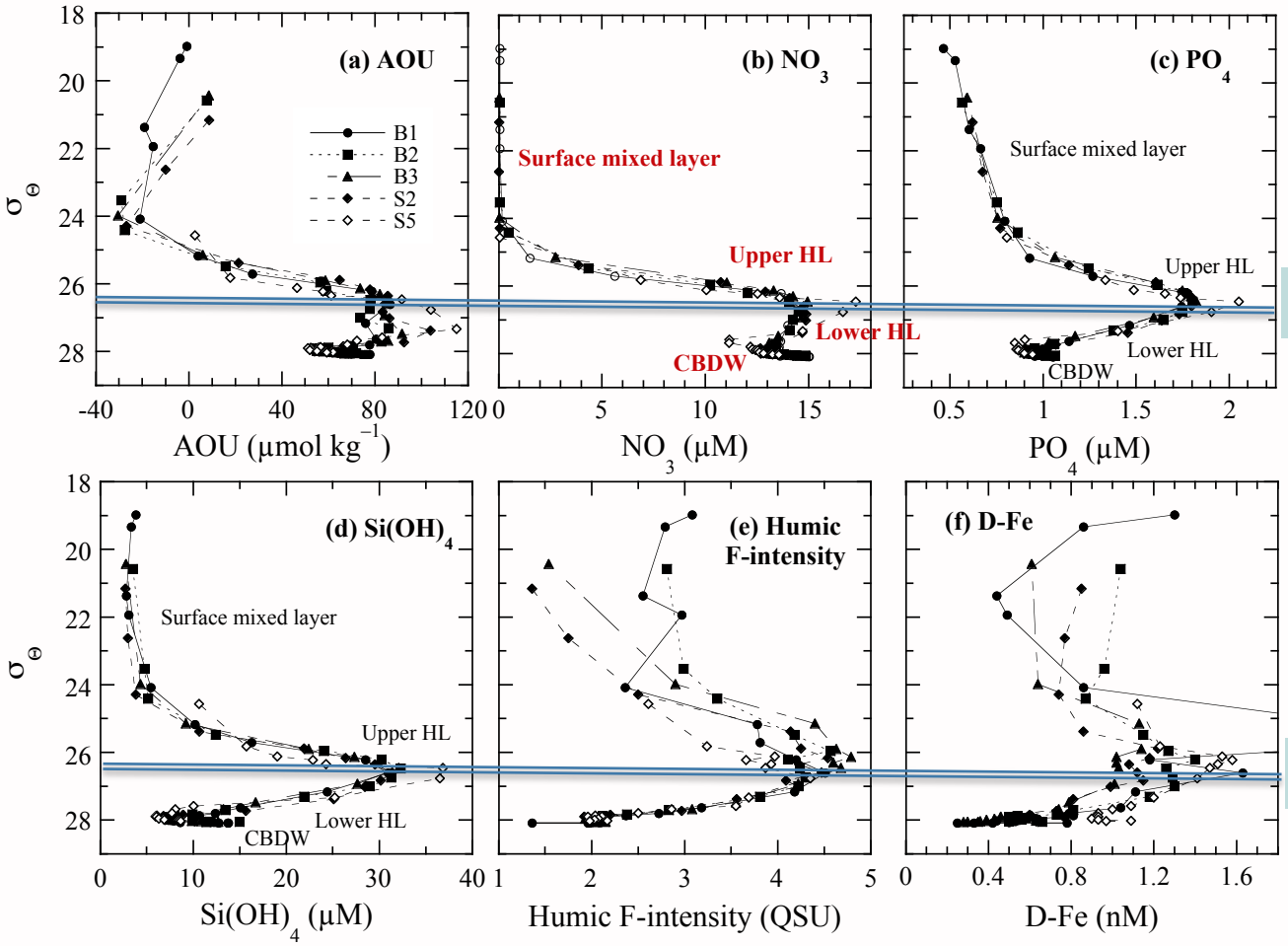


✱ Upper HL: Subsurface maxima of D-Fe (D-Fe=1.5–3 nM)
Supply of D-Fe through the organic decomposition in the shelf sediments to the overlying water in the shallower shelves

✱ Lower HL: Very high T-Fe concentration at the bottom (T-Fe=250–500 nM)
Sediment resuspension on the shelves by the inflow of the Atlantic water into Lower HL

AOU, nutrients, humic-type F-intensity and [D-Fe] against potential density (σ_θ)

Fig. 10



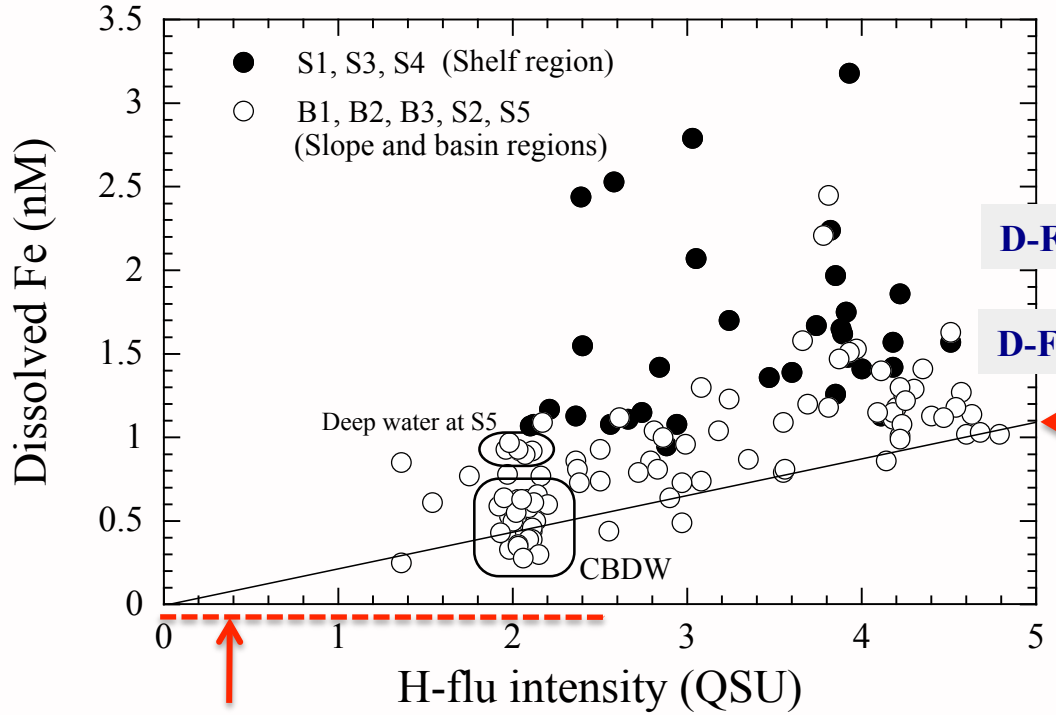
26-27

26–27

(1) Photo-degradation of humic-type FDOM in the surface mixed layer and Upper HL
(2) D-Fe production and scavenging Fe removal in the Upper HL and Lower HL depending on the location

Relationship between D-Fe and humic-type F-intensity in the shelf region and slope and basin regions

Fig. 11



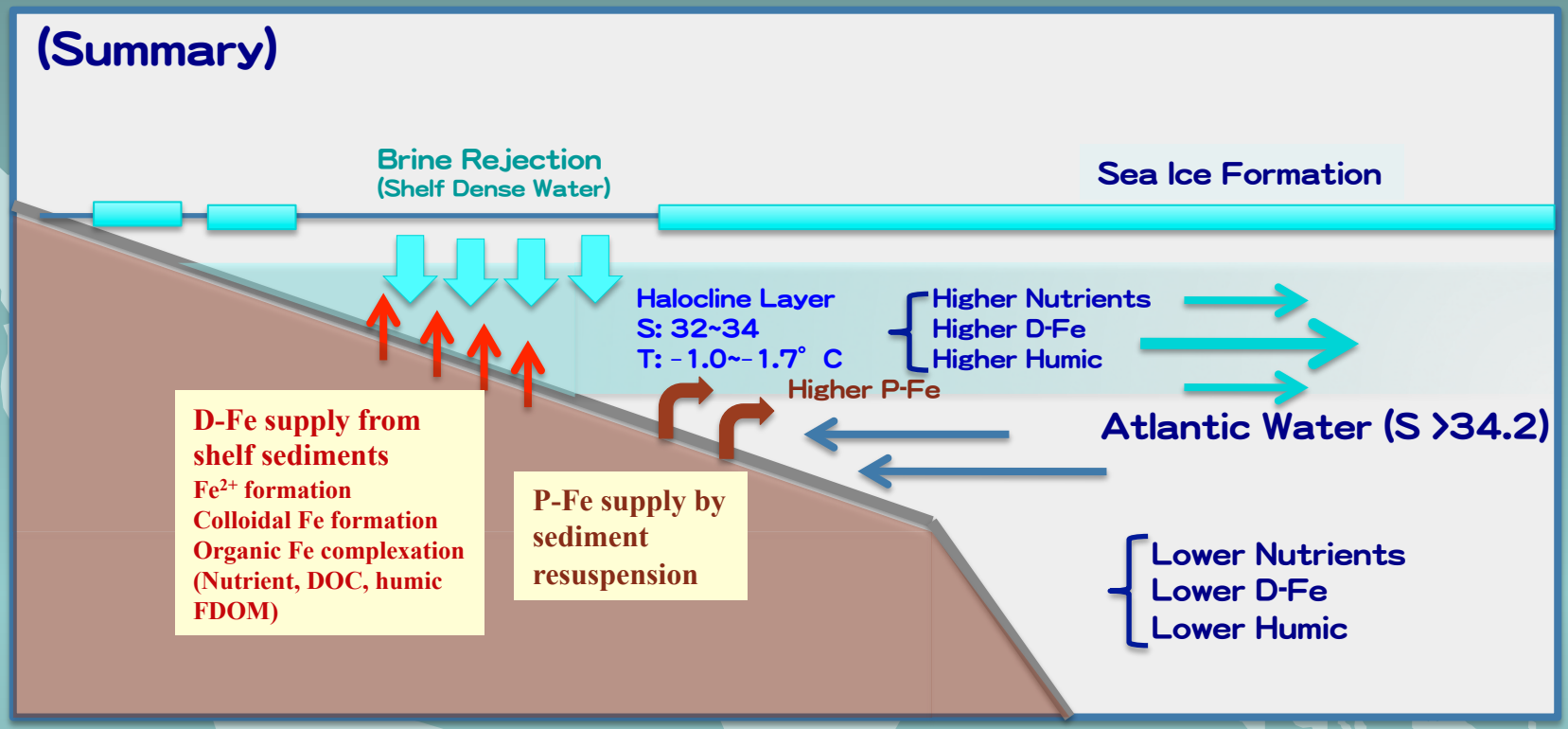
D-Fe in shelf region

D-Fe in slope and basin regions

*** Fe(III) solubility equilibrium**
A linear relationship between Fe(III) solubility and humic F-intensity in the North Pacific Ocean
(Kitayama et al., 2009)

H-flu intensity (<2.5 QSU) in the North Pacific Ocean

Higher D-Fe concentration in shelf region > slope and basin regions: High D-Fe production in shelf region



(1) Brine rejection during sea ice formation

Formation of dense shelf water with low-temperature and high-salinity

(2) Interactions between brine waters and sediments in the shallower shelves

Supply of D-Fe, nutrient and humic-type FDOM from shelf sediments to the overlying water

(3) Sediment resuspension on the shelves by inflow of the Atlantic water

High T-Fe in Lower HL

END