Ocean acidification variability in Atlantic and Arctic influenced Norwegian waters Elizabeth Jones¹, Melissa Chierici^{1,2}, Helene Hodal Lødemel¹, Claire Mourgues¹ ¹Institute of Marine Research, Tromsø ²The University Centre in Svalbard, Longyearbyen elizabeth.jones@hi.no **Long-term observations** of pH and carbonate Decade of ocean saturation (Ω) identify acidification drivers of ocean monitoring acidification in Atlanticand Arctic waters Atlantic Water core ph → Kystvann Dybde (m) → Atlantisk vann 1 000-2 000 0-200 → Arktisk vann 200-400 2 000-3 000 Polarfront 400-1 000 < 3 000 **Barents Sea** 71°N Ω aragonite **Variability from Atlantic Trends of annual means** and Arctic waters. 2011-2021 in Atlantic Water **Organic matter** $pH - 0.006 yr^{-1}$ remineralisation and 71°N 72°N Ω -0.02 yr ⁻¹ freshwater input decreases pH and Ω in **Arctic water Trends of annual means** Depth [m] 1500 **2013-2020 in Arctic water** $pH - 0.002 yr^{-1}$ Variability driven by Ω –0.004 yr ⁻¹ mixing of water ArdW ara gonite saturation 2013 to 2020 masses. **Anthropogenic CO₂** and organic matter remineralisation (releases CO₂) decreases pH and Ω in Atlantic Water W Ar: F(7;72) = 1,978; p = 0,0699 T Mean±SD Norwegian Sea → Kystvann Dybde (m) Atlantisk vann 0-200 200-400 → Arktisk vann Variability driven by 400-1 000 1 000-2 000 2 000-3 000 mixing of water 70°N masses. Anthropogenic CO₂ and organic matter remineralisation (releases CO₂) decreases pH and Ω IS ANDSHAVE TOOO 65°N in Atlantic Water **Trends of annual means 2012-2020 in Atlantic North Sea** Water (Skagerrak) pH –0.008 yr ⁻¹ Ω –0.03 yr ⁻¹ 60°N -Atlantic Water core pH Atlantic Water core Ω Ar 58.4°N 58.3°N 20°W 10°W Ω aragonite Depth [m] 300 ocean acidification - the lowering of CO₂ (atmosphere) seawater pH, carbonate ions and calcium carbonate saturation (Ω) $CO_2 + H_2O \longleftrightarrow H_2CO_3 \longleftrightarrow H^+ + HCO_3^- \longleftrightarrow H^+ + CO_3^2$ 58.3°N 58.4°N 58.1°N 58°N This work is part of Monitoring ocean acidification in Norwegian Seas carbonic acid bicarbonate carbonate funded by the Norwegian Environment Agency.