UNDERWATER LIGHT AVAILABILITY IN FJORDAL ECOSYSTEMS

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Role of light in aquatic ecosystems

- Light plays an essential role in aquatic food webs
- Under water, light is either absorbed or scattered by water constituents
- The optically active constituents (OACs) include phytoplankton, organic matter and sediments
- Abundance of OACs determine light availability underwater
- The constituents also determine color of water in aquatic ecosystems

Accelerated melting in the Arctic

- Greenland, 2nd largest Ice-Sheet in the world
- Its mass loss has quadrupled over last two decades
- Meltwater contributes to about ¼ th of the present sea level rise
- Melting glaciers also release sediments referred to as ‘glacial flour’
- Released sediments affect light availability and alter ecosystem functioning

Fjords along coasts of Norway & Greenland

- Fjords are estuaries formed by glacial activity
- Fjords form transition zones between Ice-sheets and the ocean
- Profiles of spectral light measured using radiometers
- Water samples collected at discrete depths to determine concentrations of optically active constituents

Key findings & Take away

- Three spectral types of one percent irradiance curves identified along fjord transects in Norway and Greenland
  - Type 1: V-shaped, with ~ 500 nm traveling deepest
  - Type 2: U-shaped, with ~ 500 - 560 nm traveling deepest
  - Type 3: V-shaped, with ~ 560 nm traveling deepest
  - Spectral types not specific to fjord sections but strongly influenced by concentrations of optically active constituents in the sections

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