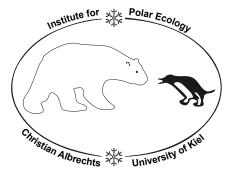
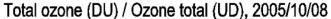
# Impact of temperature on UV-susceptibility of two *Ulva* (Chlorophyta) species from Antarctic and Subantarctic regions

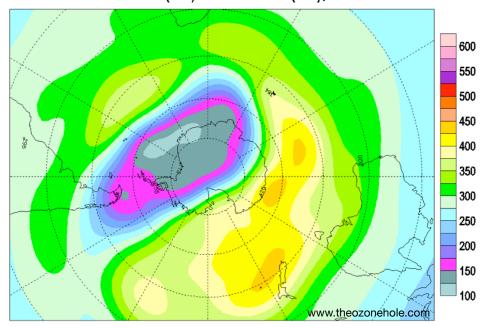


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Material Objective Results Conclusions

#### The "Antarctic ozone hole"

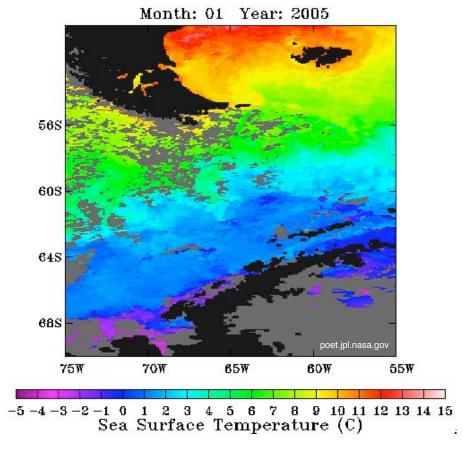




- Establishment in austral spring every year
- In 2000 and 2003: ≥28 million km<sup>2</sup>
- Extended to South America: 45°S
- Results in an increase of UV-Bradiation on earth's surface
- Increased UVB-radiation affects macroalgae as an important ecological component

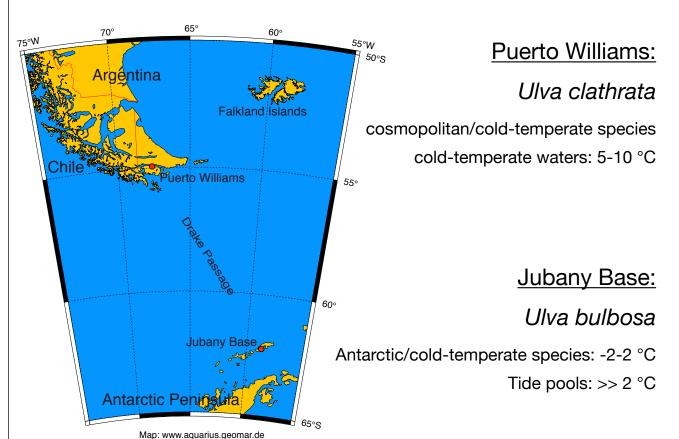
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#### Water temperatures



- Controlling macroalgal growth, distribution and stress
- Potential changes of water temperatures in Antarctica affect marine life, e.g. macroalgae

### Algal material



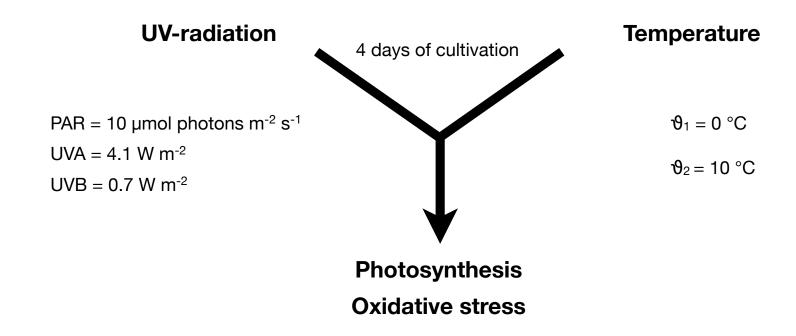


Ulva clathrata



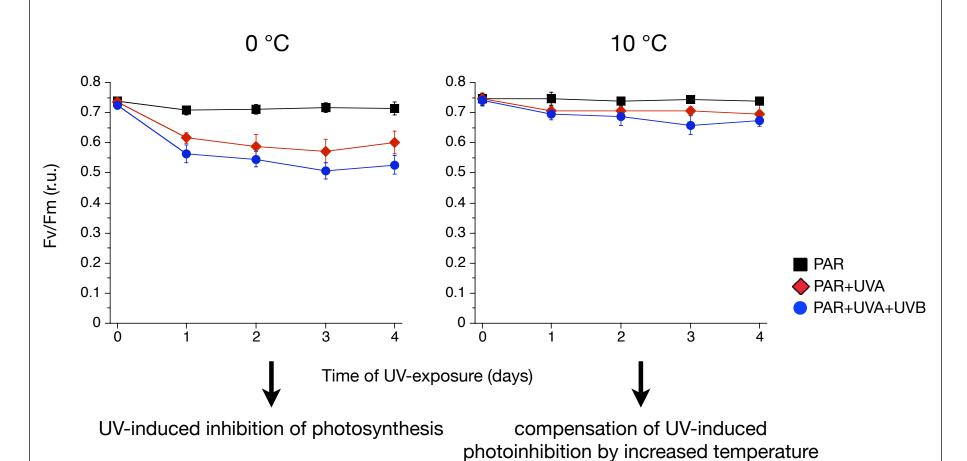
Ulva bulbosa

#### Objective of the study

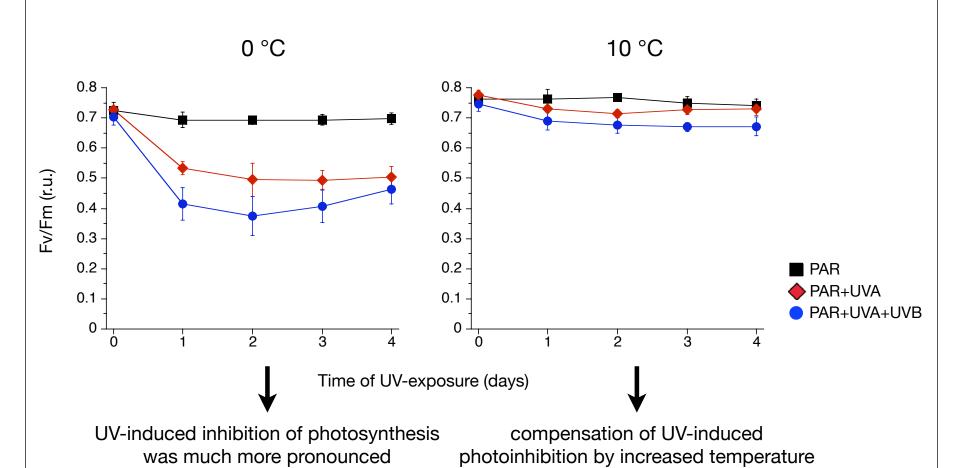


Interactive effects of UV-radiation and temperature on the physiological and ecological level

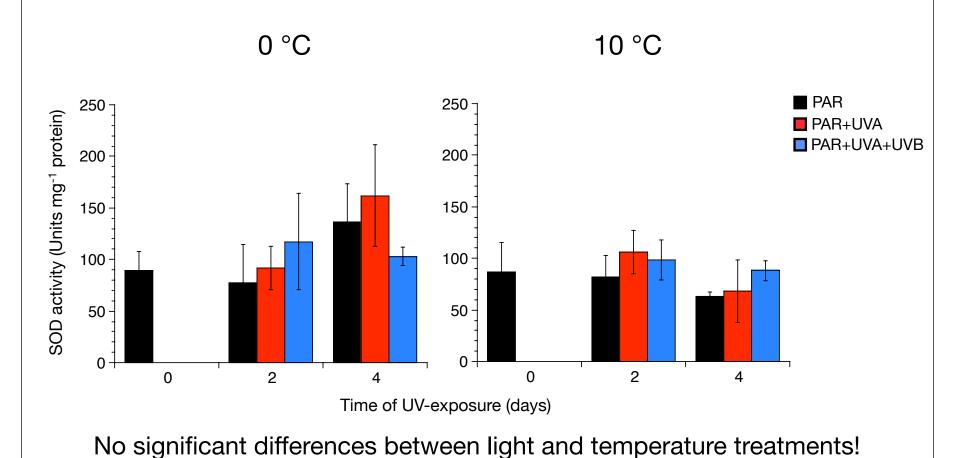
## Photosynthesis of *U. bulbosa*



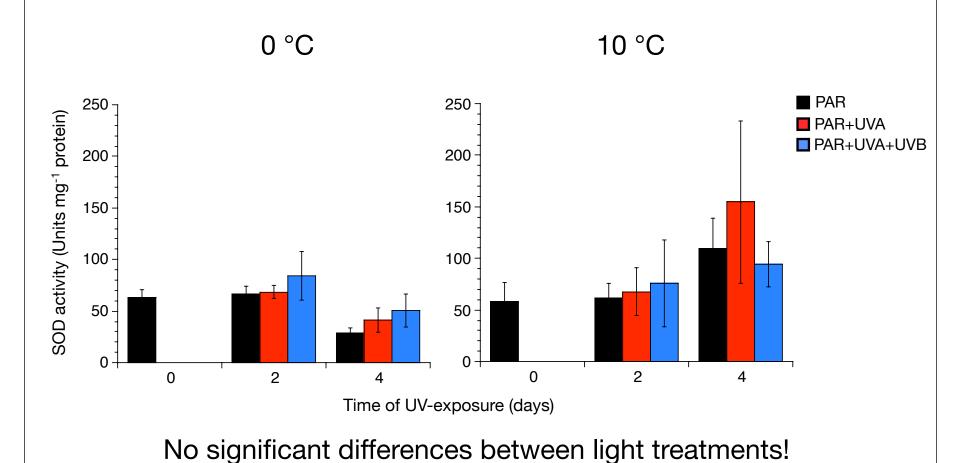
#### Photosynthesis of *U. clathrata*



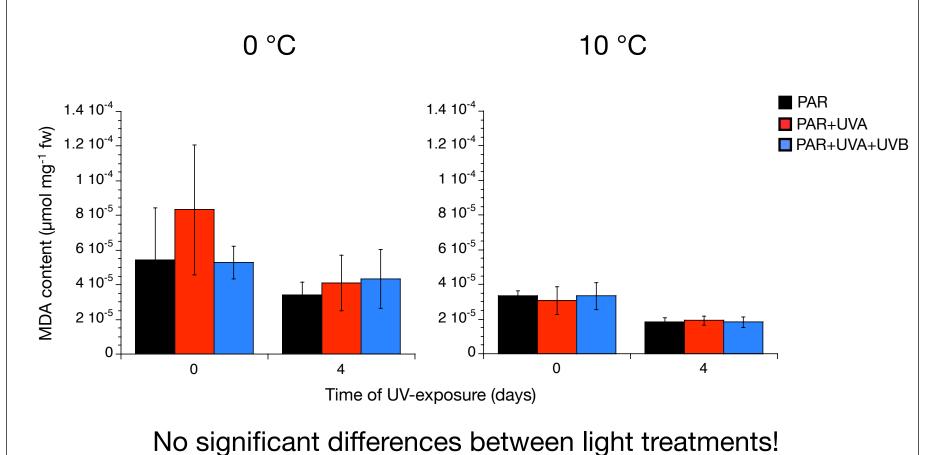
#### Activities of superoxide dismutase in *U. bulbosa*



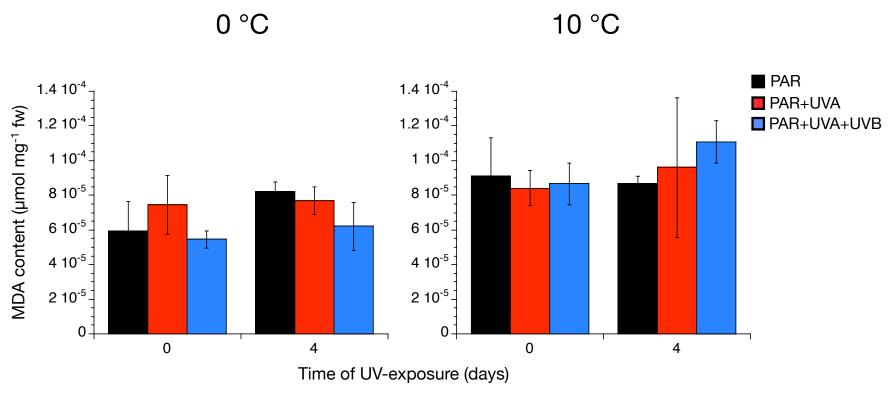
#### Activities of superoxide dismutase in *U. clathrata*



#### Content of malondialdehyde in *U. bulbosa*



#### Content of malondialdehyde in *U. clathrata*



No significant differences between light treatments!

#### Physiological interpretation

- UV-radiation induced inhibition of photosynthesis at 0 °C but did not cause any oxidative stress
- Compensation of UV-induced photoinhibition by increased temperature, probably due to increased activities of key enzymes involved in photoprotection
- Higher SOD activities in *U. bulbosa* than in *U. clathrata* suggest a more efficient management of oxidative stress at permanent low temperatures

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#### **Ecological Interpretation**

- U. bulbosa seems better adapted to cope with UVradiation than U. clathrata at lower temperatures
- *U. bulbosa* in the eulittoral is affected by UV-radiation but photoinhibition is reversible
- In tide pools, increased temperatures may diminish UVeffects in *U. bulbosa*
- U. clathrata from South America does not experience similarly low temperatures
- There, higher water temperatures facilitate a higher activity of physiological protection mechanisms



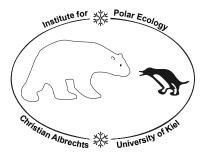
# Thank you for your attention.

Deutsche Forschungsgemeinschaft









Rautenberger R and Bischof K (2006) Impact of temperature on UV-susceptibility of two *Ulva* (Chlorophyta) species from Antarctic and Subantarctic regions. **Polar Biology** (Online First)