

## **Contrasting Sensitivity of Marine Biota to UV-B Radiation Between Southern and Northern Hemispheres**

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### **Abstract**

The asymmetries between hemispheres in stratospheric ozone concentration and atmospheric aerosols, leading to differences in incident ultraviolet B (UV-B) radiation, were examined in order to resolve the differential forcing of adaptation and selection of marine organisms under elevated UV-B radiation. This analysis was based on a meta-analysis including 2,060 experimental assessments of responses of marine organisms from the Northern and Southern Hemispheres to UV-B. Stratospheric ozone concentration in spring and summer decreased by 11.0 % in the Southern and 2.7 % in the Northern between 1970 and 2012, indicating higher UV-B incidence on the Southern Hemisphere. The ratio of studies on UV-B radiation impacts performed in the Southern against the Northern Hemisphere was 0.34 indicating higher research effort in the Northern Hemisphere. Responses of marine biota to UV-B indicated significantly more resistance of marine organisms tested from the Southern Hemisphere ( $P < 0.01$ ) to UV-B radiation. Marine plants (angiosperm, macroalgae and microalgae) showed no significant differences in UV-B sensitivity between hemispheres, but the family Ulvaceae, showed significantly more resistance to UV-B for organisms tested from the Southern Hemisphere ( $P < 0.005$ ). Echinodermata tested from the Southern Hemisphere were more resistant to UV-B ( $P < 0.005$ ), as well as early stages of marine organisms ( $P < 0.001$ ). Responses at the molecular and cellular level and demographic levels showed lower UV-B effects in the organisms tested from the Southern Hemisphere. The results obtained suggest that marine organisms from the Southern Hemisphere tend to be more resistant to UV-B radiation than those in the Northern Hemisphere..

### **Keywords**

North, South, UV-B, Marine biota, Ozone, Global change.