The filamentous rhodophytes *Callithamnion gaudichaudi* Agardh and *Ceramium* sp. were utilized to study the effects of solar radiation (PAR, 400–700 nm, UV-B, 280–315 nm and UV-A, 315–400 nm) on the photosynthetic performance in situ in Patagonia waters (Argentina). A pulse amplitude modulated (PAM) fluorometer was used to determine the fluorescence parameters. The two species grew in different habitats in the eulittoral: *Ceramium* sp. was found only in rock pools while *C. gaudichaudii* grew on exposed rocks and fell dry during low tide. Both species differed in their fluorescence parameters and their sensitivity to solar radiation exposure. The photosynthetic quantum yield had its lowest values at noon, but it recovered in the afternoon/evening hours, when irradiances were lower. PAR (irradiance of about 400 W m^{-2} at noon) was responsible for most of the decrease in the yield on clear days, especially in *Ceramium* sp., but UVR (280–400 nm) also accounted for a significant decrease. Fluence rate response curves indicated that both species were adapted to low fluence rates and showed a pronounced non-photochemical quenching at intermediate and higher irradiances. Both species showed a rapid adaptation during measurement of fast induction kinetics but differed significantly in their fluorescence components. All photosynthetic pigments were bleached after 8 h exposure to solar radiation over a full day. Strong absorption in the UV-A range, most likely due to mycosporine-like amino acids, was detected in both strains. The pronounced sensitivity to solar radiation in situ and the recovery capacity of these two filamentous Rhodophyte species, as well as the presence of protective compounds, suggests that these algae have the ability to adapt to the relatively high radiation levels and changes in irradiance found in the Patagonia waters.