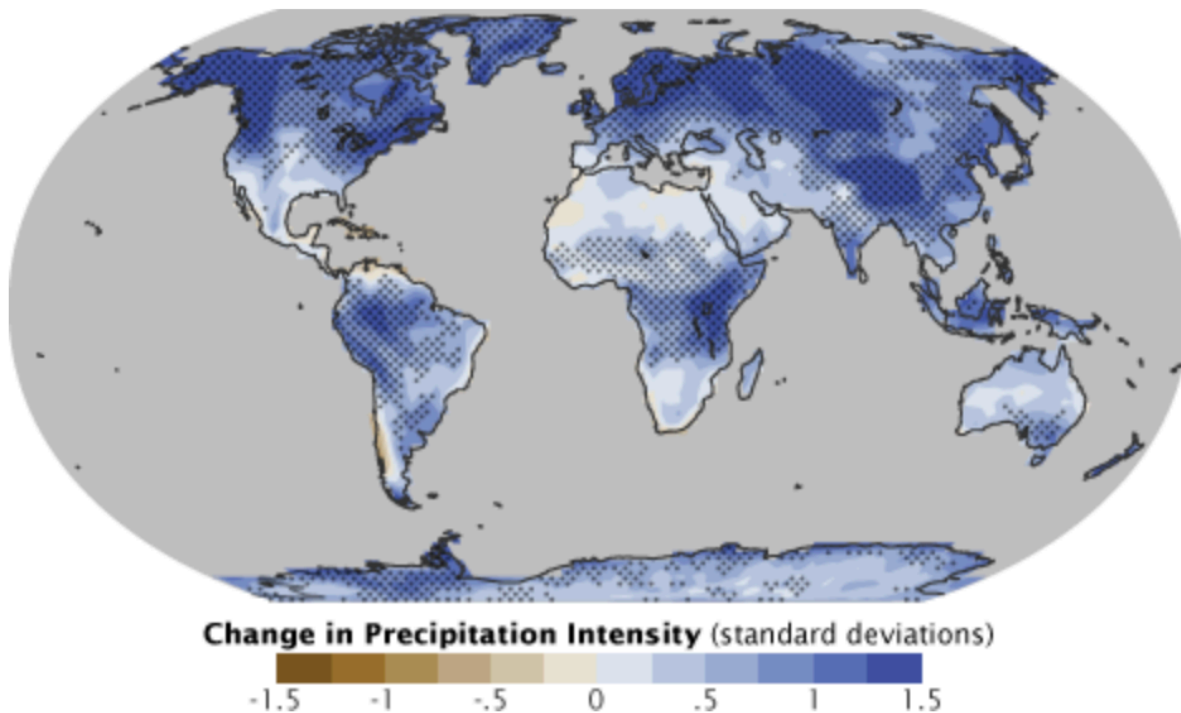


## The Water Cycle and Climate Change

Among the most serious Earth science and environmental policy issues confronting society are the potential changes in the Earth's water cycle due to climate change. The science community now generally agrees that the Earth's climate is undergoing changes in response to natural variability, including solar variability, and increasing concentrations of greenhouse gases and aerosols. Furthermore, agreement is widespread that these changes may profoundly affect atmospheric water vapor concentrations, clouds, precipitation patterns, and runoff and stream flow patterns.

For example, as the lower atmosphere becomes warmer, evaporation rates will increase, resulting in an increase in the amount of moisture circulating throughout the troposphere (lower atmosphere). An observed consequence of higher water vapor concentrations is the increased frequency of intense precipitation events, mainly over land areas. Furthermore, because of warmer temperatures, more precipitation is falling as rain rather than snow.



One expected effect of climate change will be an increase in precipitation intensity: a larger proportion of rain will fall in a shorter amount of time than it has historically. Blue represents areas where climate models predict an increase in intensity by the end of the 21st century, brown represents a predicted decrease. (Map adapted from the IPCC Fourth Assessment Report.)