<table>
<thead>
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<th>Name</th>
<th>On the Relation Between Large-Scale Circulation Pattern and Heavy Rain Events Over the Hawaiian Islands: Recent Trends and Future Changes</th>
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</thead>
</table>
| Regions | - Central North Pacific  
| | - State Of Hawaii  
| Essential Climate Variable | - Atmospheric Data  
| Phenomena/Impacts | - Rainfall  
| Spatial/Scale | - Grid  
| Methodology | - Insitu  
| | - Remote  
| | - Statistical  
| Sectors | - Fresh Water  
| | - Ecological  

**Description**
The aim of this paper is to present a statistical downscaling method in which the relationships between present-day daily weather patterns and local rainfall data are derived and used to project future shifts of the frequency of heavy rainfall events under changing global climate conditions. NCEP reanalysis data from wet season months (Nov-Apr) 1958-2010 are composited for heavy rain days at twelve rainfall stations in the Hawaiian Islands. The occurrence of heavy rain events (days with amounts above the 90th percentile estimated from all wet season rain days 1958-2010) was found to be strongly correlated with upper level cyclonic circulation anomalies centered northwest of Hawaii and south-to-north transport of water vapor in the middle troposphere. The statistical downscaling model (SD) developed in this study was able to reproduce the observed interannual variations in the number of heavy rain events based on cross-validation resampling during the more recent interval 1978-2010. However, multi-decadal changes associated with the mid-1970s climate shift were not well reproduced by the SD using NCEP reanalysis data, likely due to inhomogenities in the pre-satellite period of the NCEP reanalysis. Application of the SD to two model scenarios from the CMIP3 database indicates a reduction of heavy rain events in the mid to late 21st century. Based on these models, the likelihood of a widespread increase in synoptic heavy rain events in Hawaii as a result of anthropogenic climate change is low over the remainder of the century.

**Url**

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