Influence of the Santa Cruz Mountains on Precipitation from a Landfalling Atmospheric River

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Outline

I. Overview of stable water isotopologues

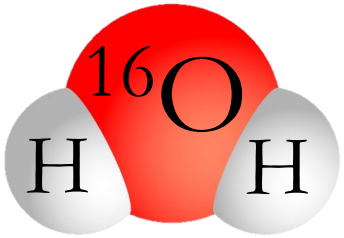
II. Location – The Santa Cruz Mountains

III. Methods

IV. Event isotopologue time series

V. Rainout results and implications

I. Overview of stable water isotopologues



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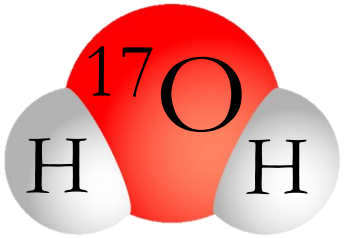

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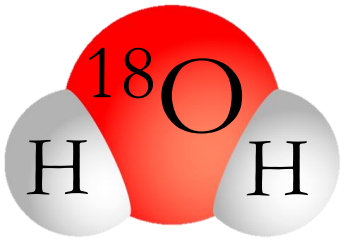

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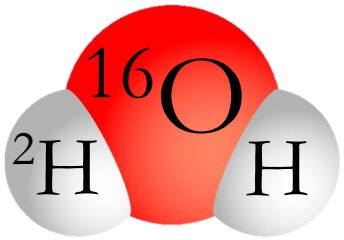
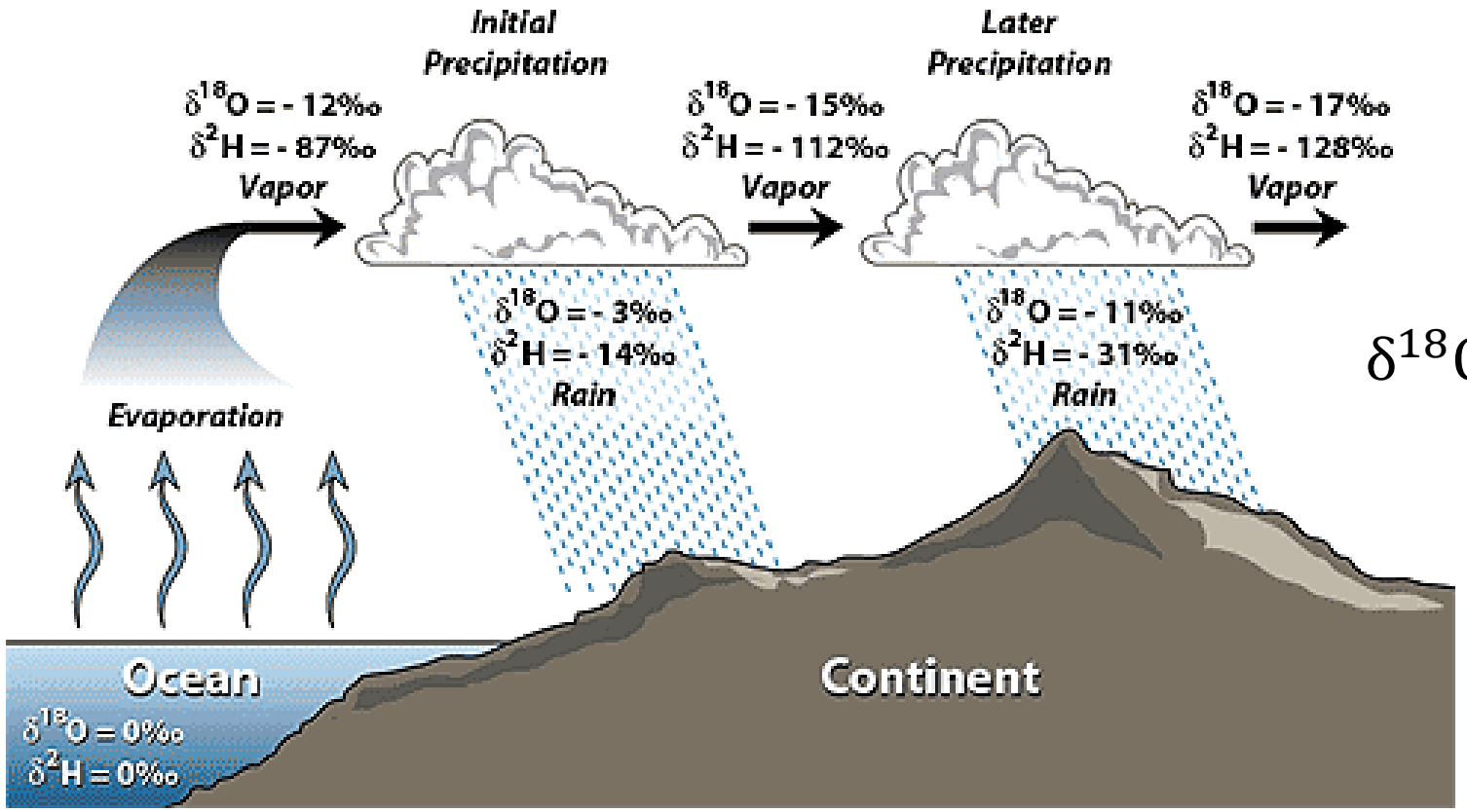


0.031%

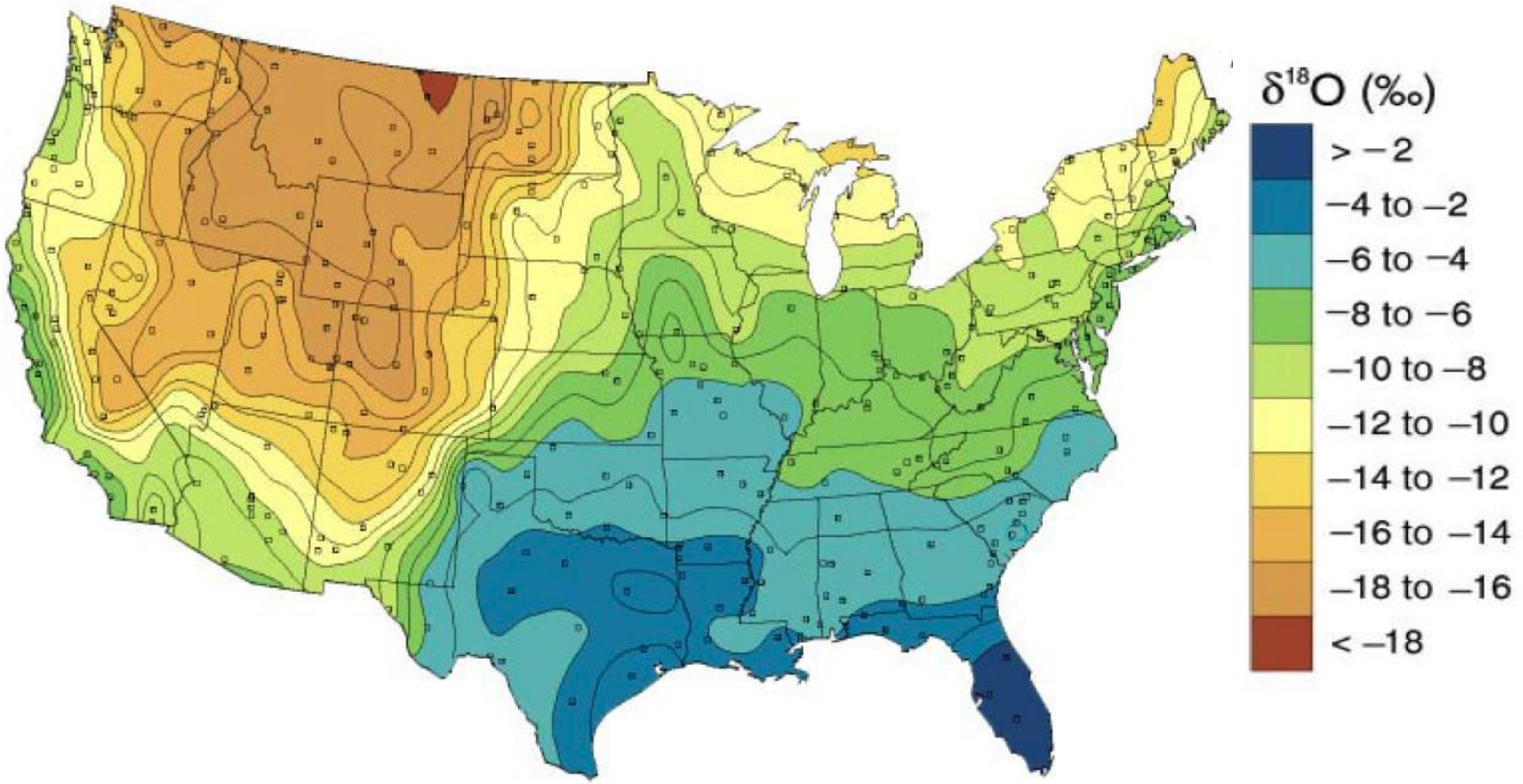
$$\delta^{18}O = \left(\frac{\left(\frac{^{18}O}{^{16}O}\right)_{Sample}}{\left(\frac{^{18}O}{^{16}O}\right)_{Standard}} - 1 \right) * 1000‰$$

I. Overview of stable water isotopologues



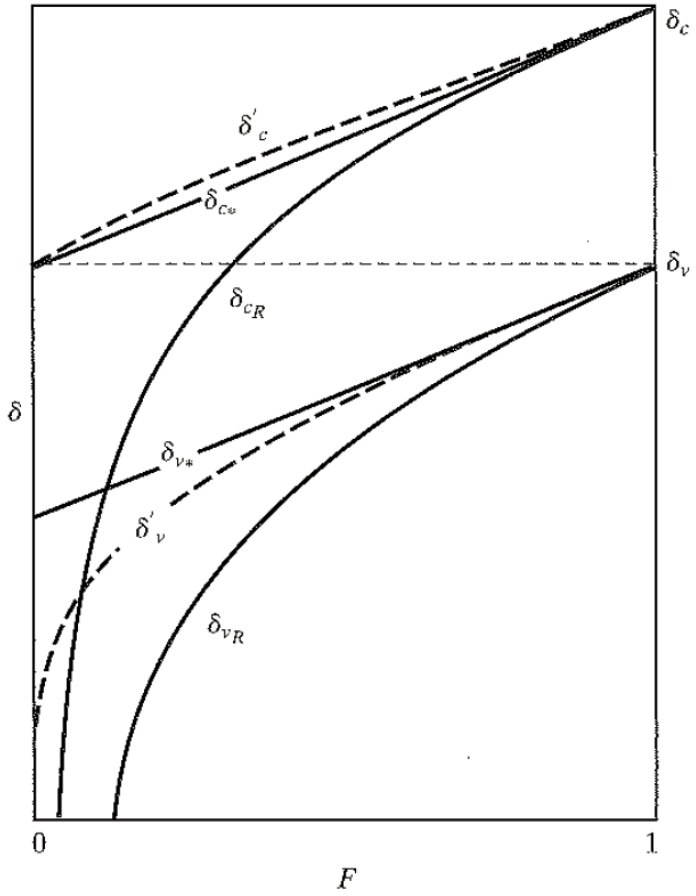
$$\delta^{18}O = \left(\frac{\left(\frac{^{18}O}{^{16}O}\right)_{Sample}}{\left(\frac{^{18}O}{^{16}O}\right)_{Standard}} - 1 \right) * 1000‰$$

I. Overview of stable water isotopologues



From Kendall and Coplen (2001)

I. Overview of stable water isotopologues

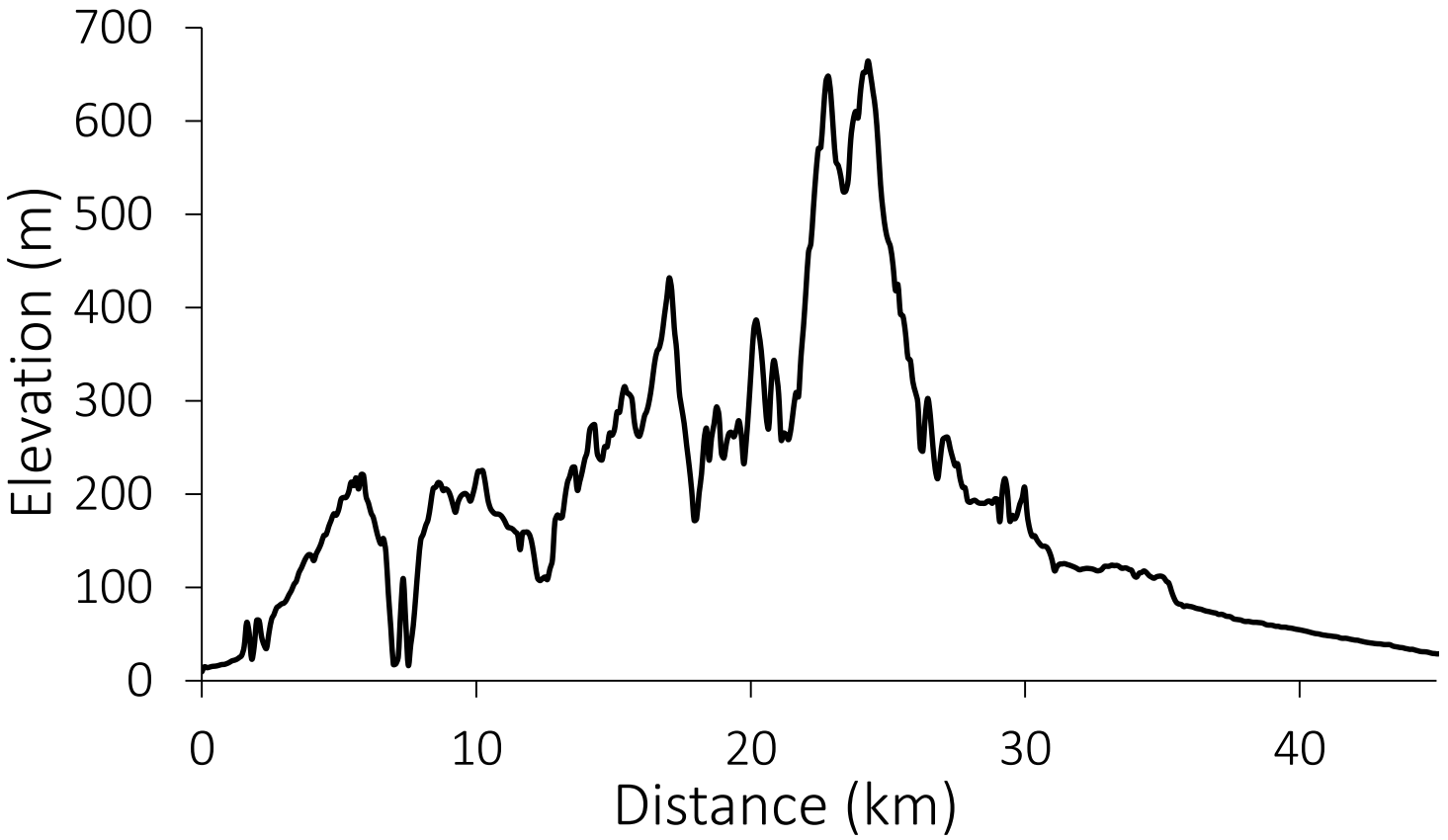


Isotopic depletion due to rainout undergoes “Rayleigh distillation” according to:

$$F = \sqrt[\alpha-1]{\frac{\delta_f + 1000}{\delta_i + 1000}}$$

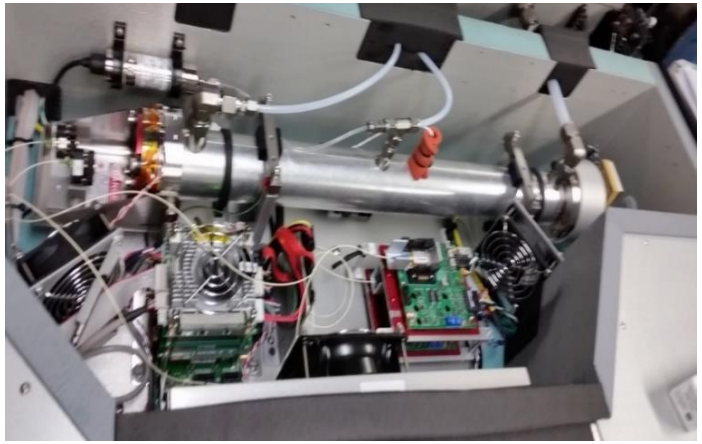
From Sharp (2007)

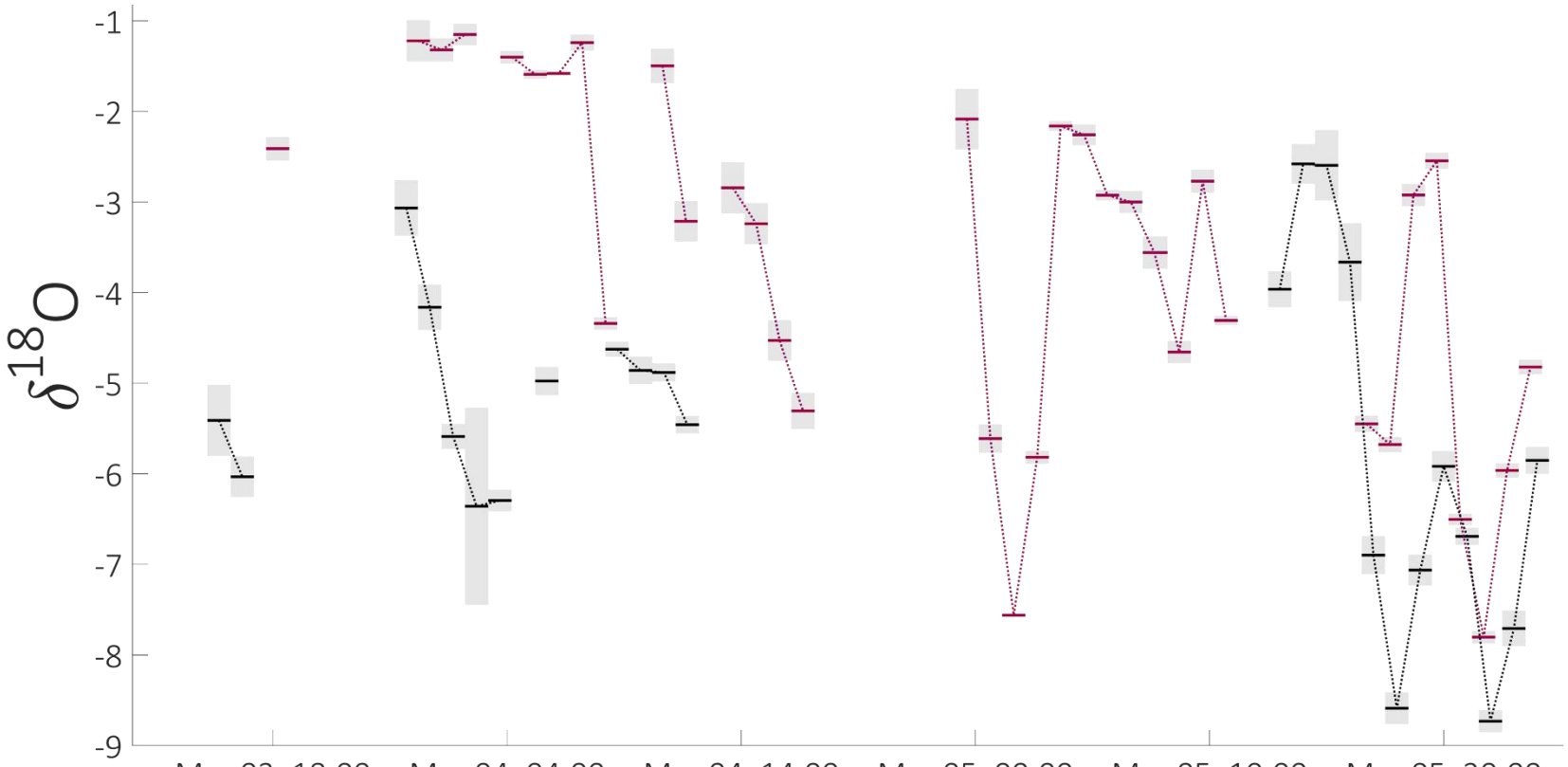
II. Location – The Santa Cruz Mountains



III. Methods

- Hourly integrated precipitation sampling conducted March 3-7, 2016 at Long Marine Lab (LML) in Santa Cruz, CA and Santa Clara University (SCU) in Santa Clara, CA using modified automated ISCO water sampler
- Isotope analysis performed using a LGR Liquid Water Isotope Analyzer with multiple USGS reference standards for control
- Synoptic-scale integrated water vapor content, sea level pressure and 850 hPa horizontal wind vectors were obtained from GFS




LML
SCU
$\delta^{18}O$
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-2
-3
-4
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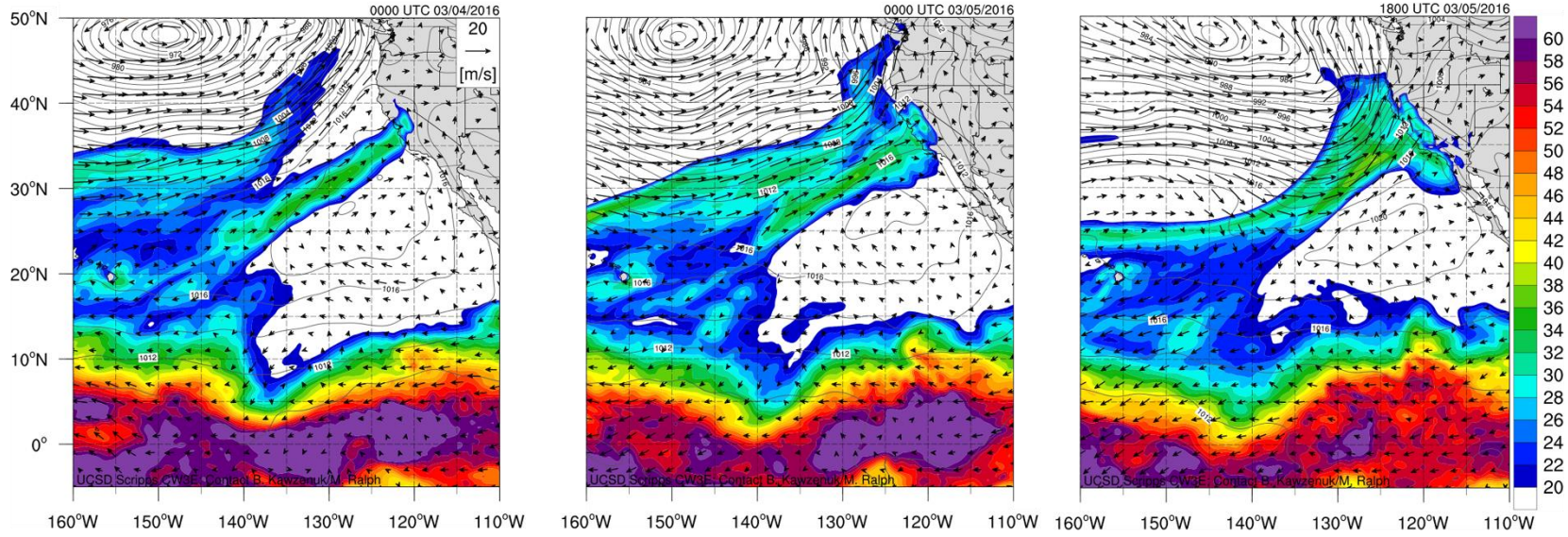
Mar 03, 18:00
Mar 04, 04:00
Mar 04, 14:00
Mar 05, 00:00
Mar 05, 10:00
Mar 05, 20:00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UCSD Scripps CW3E Contact B. Kawzenuk/M. Ralph
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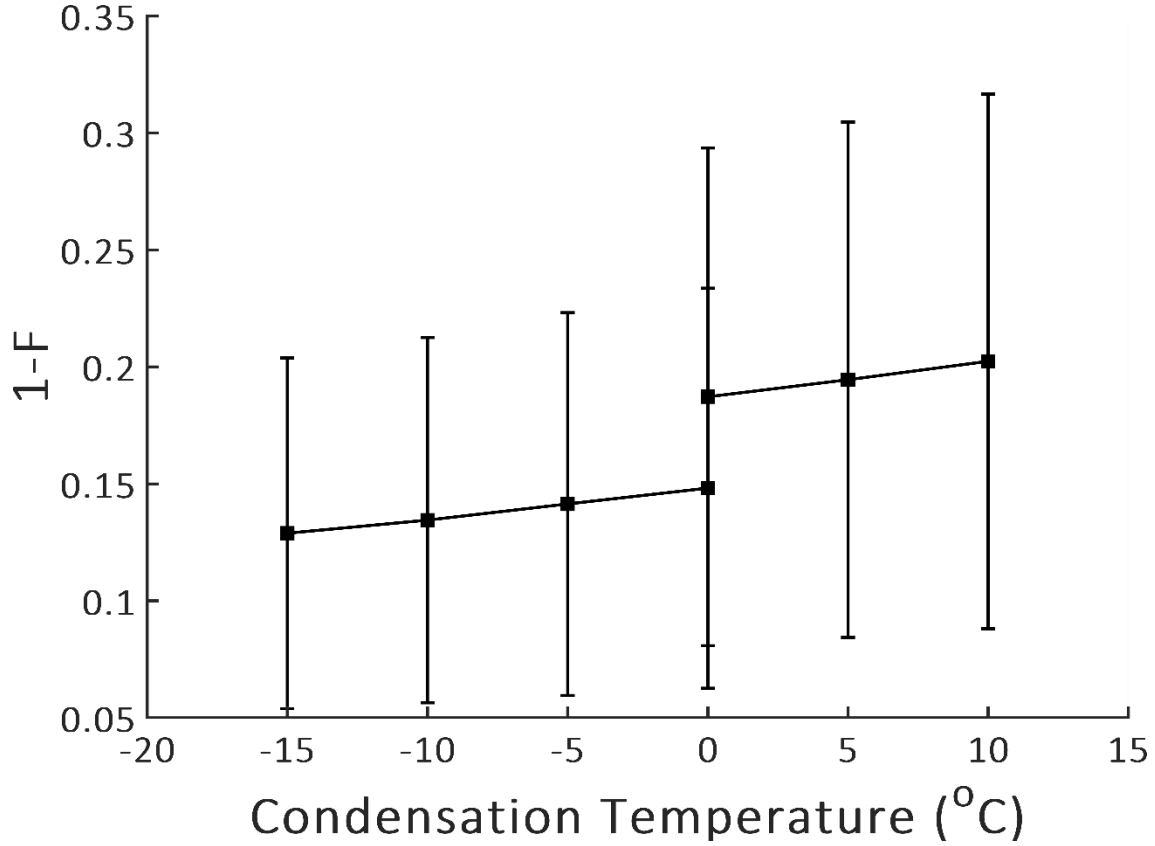
V. Rainout results and implications

What is the influence of the Santa Cruz Mountains on precipitation from an AR?



$$F = \sqrt[\alpha-1]{\frac{\delta_f + 1000}{\delta_i + 1000}}$$


Thank You!
Sean.reilly66@gmail.com