

# Evapotranspiration in Hawai'i



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**Project Update**

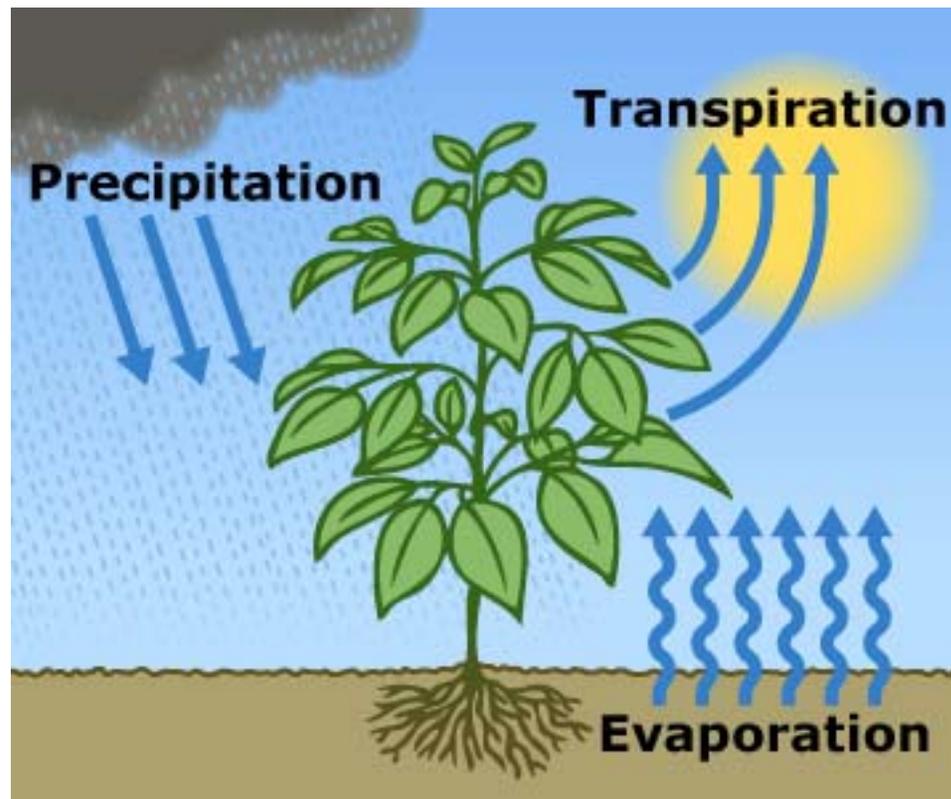
**Commission on Water Resource Management**

**21 December 2011**



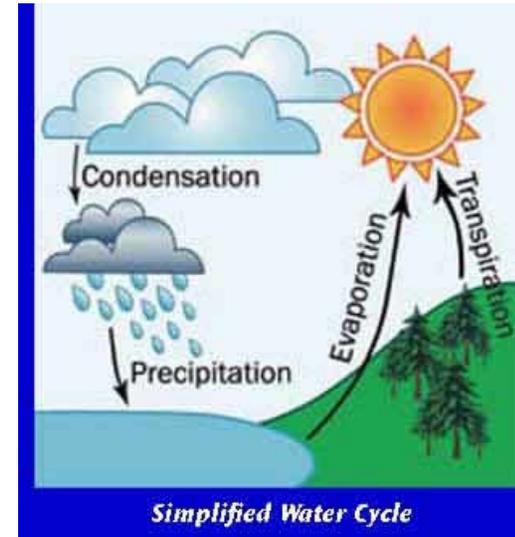
# Evapotranspiration:

The combined loss of water from the land surface through the processes of evaporation and transpiration



# Problem

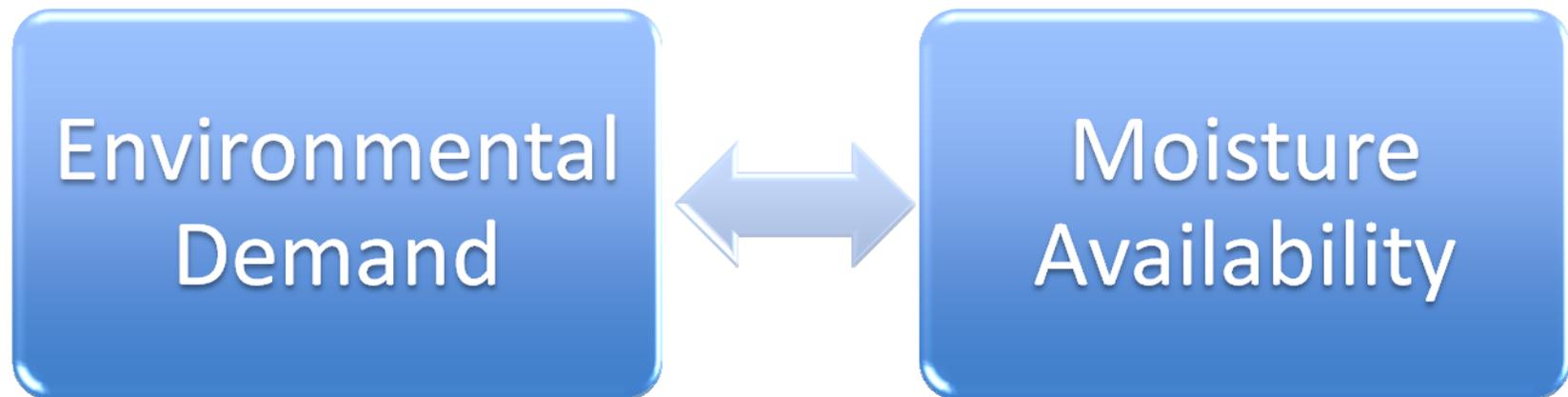
- Water resource availability is determined largely by rainfall and evapotranspiration
- The Rainfall Atlas of Hawai'i provides a state-of-the-science analysis of spatial patterns of rainfall
- No such analysis exists for evapotranspiration



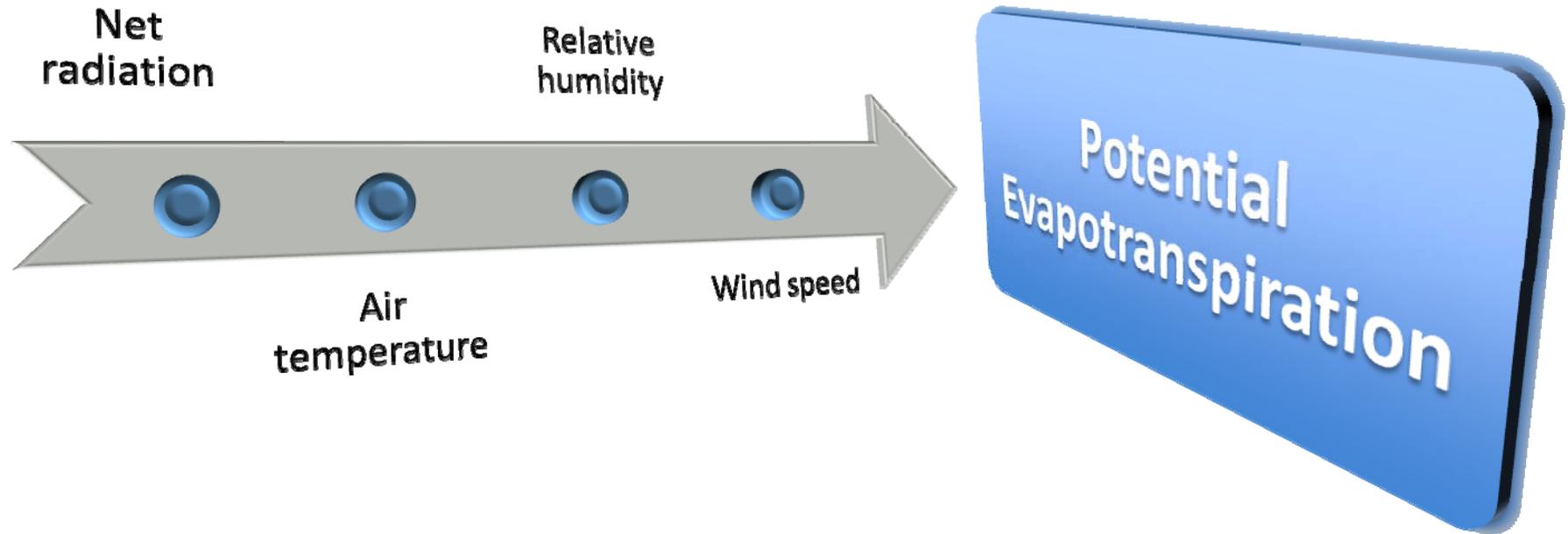
# Objective

Produce digital maps of the spatial patterns of mean monthly and annual evapotranspiration for the main Hawaiian Islands

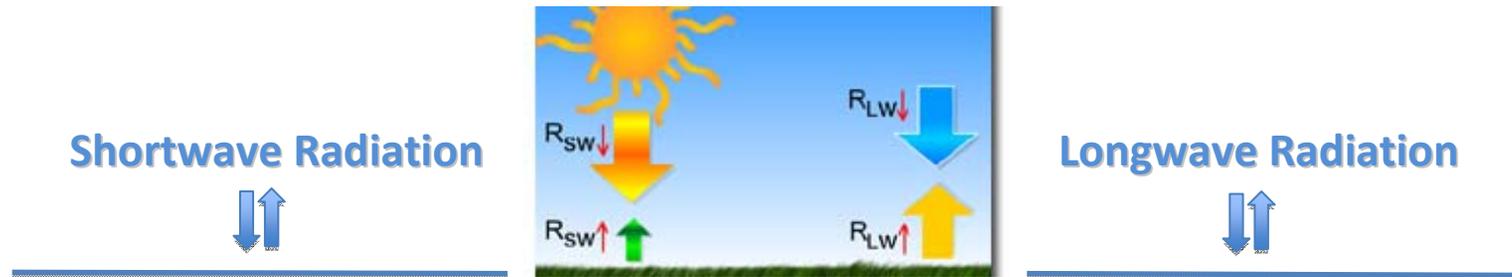
# Evapotranspiration Process



# Environmental Demand: Potential Evapotranspiration

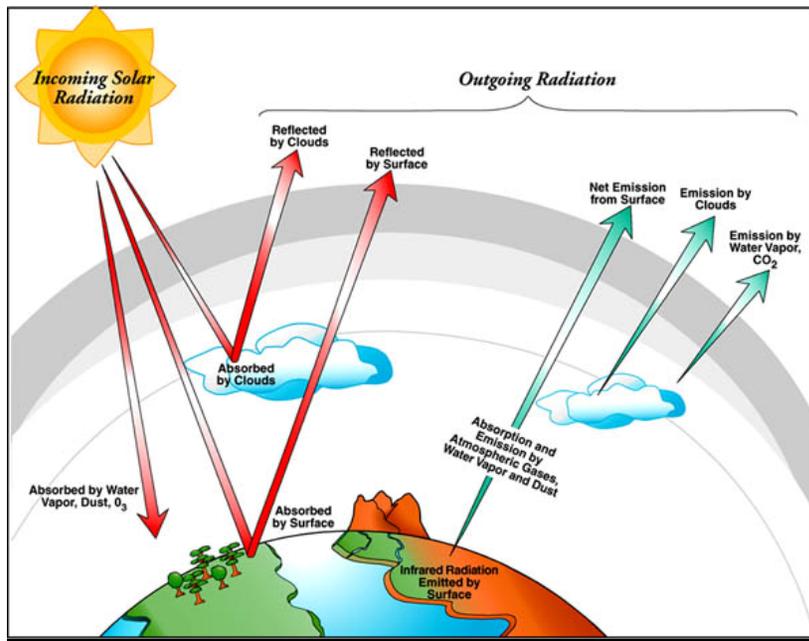


# Net Radiation



Need to Start with **Solar Radiation**

# Mapping Solar Radiation



## Model: Clear-Sky Radiation

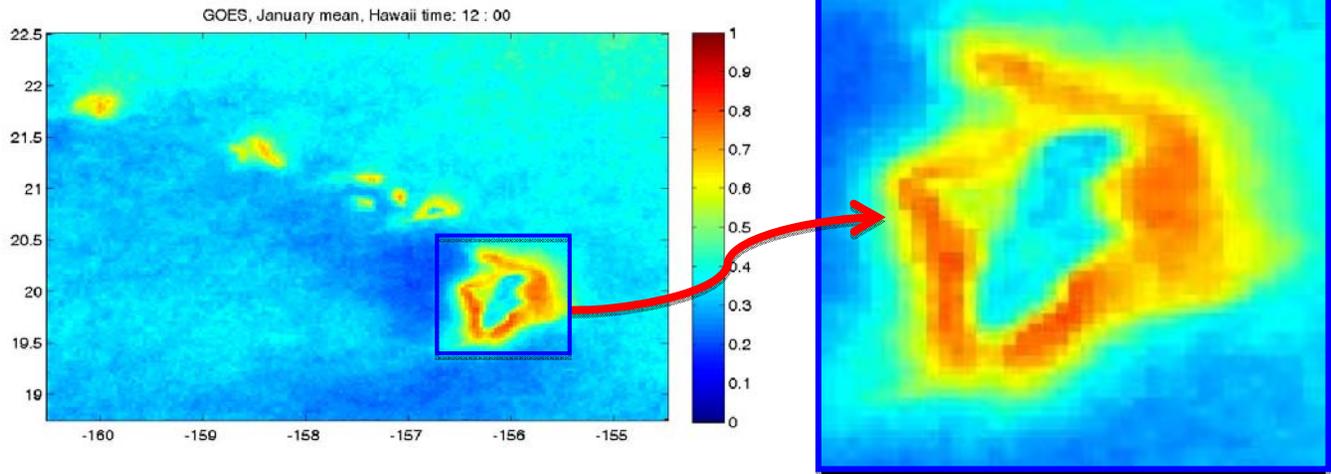
- ✓ • Test Model
- Implement Model

## Satellite Imagery: Cloud Effects

- ✓ • Get MODIS Data
- ✓ • Get GOES Data
- Merge MODIS and GOES Data

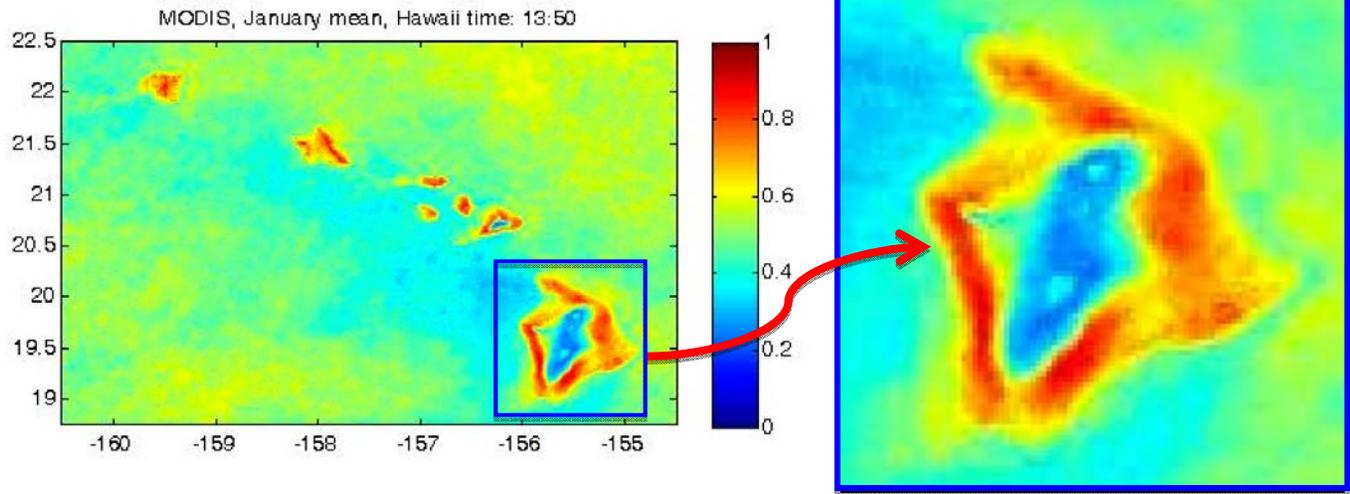
# Satellite Cloud Data: GOES and MODIS

## GOES



- 4-km resolution
- 96 per day

## MODIS



- 1-km resolution
- 4 per day

# Expected Products

**High-resolution, digital mean monthly and annual maps of:**

- Clear-sky radiation
- Cloudiness
- Solar radiation
- Net radiation
- Temperature
- Humidity
- Potential Evapotranspiration
- Evapotranspiration

An aerial photograph of a dense forest with various shades of green. The word "MAHALO" is overlaid in the center in large, orange, 3D block letters. The letters have a slight shadow and a metallic sheen. The forest below is a mix of dark green and lighter green, suggesting different tree species or a canopy with some gaps. The overall scene is a lush, natural landscape.

MAHALO