

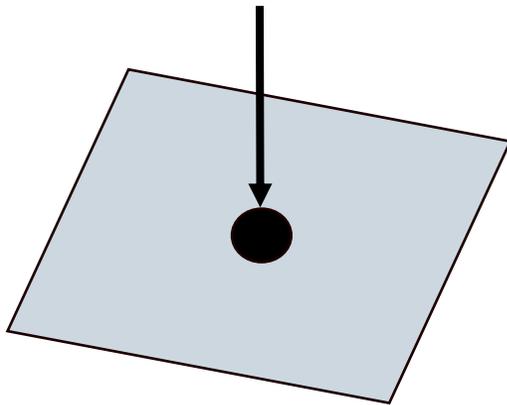
# Snobal Lineage and Terminology

- Image Processing Workbench (IPW) → multipurpose library that contained the first incarnation of Snobal
- Snobal: dedicated **snow** mass and energy **balance** model (1D point model; written in C)
- iSnobal: dedicated **snow** mass and energy **balance** model distributed over an **image** (2D model in which Snobal is run at each grid cell; written in C)
- PySnobal: Refers to (1) the Python module used to invoke Snobal and (2) the greater **Python** wrapper for both **Snobal** and iSnobal
- iPySnobal: **Python** module used to invoke **iSnobal**
- Automated Water Supply Model (AWSM): a framework that simplifies configuring and running iPySnobal

# Snobal Lineage and Terminology

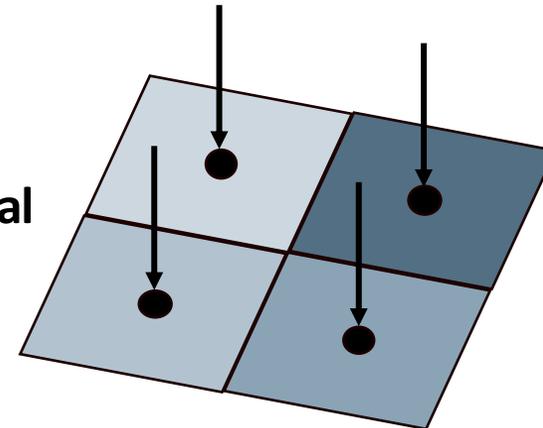
Snobal and PySnobal are often used interchangeably to refer to **modeling the snowpack at a point** using, at the lowest level, Snobal C binaries.

Snobal

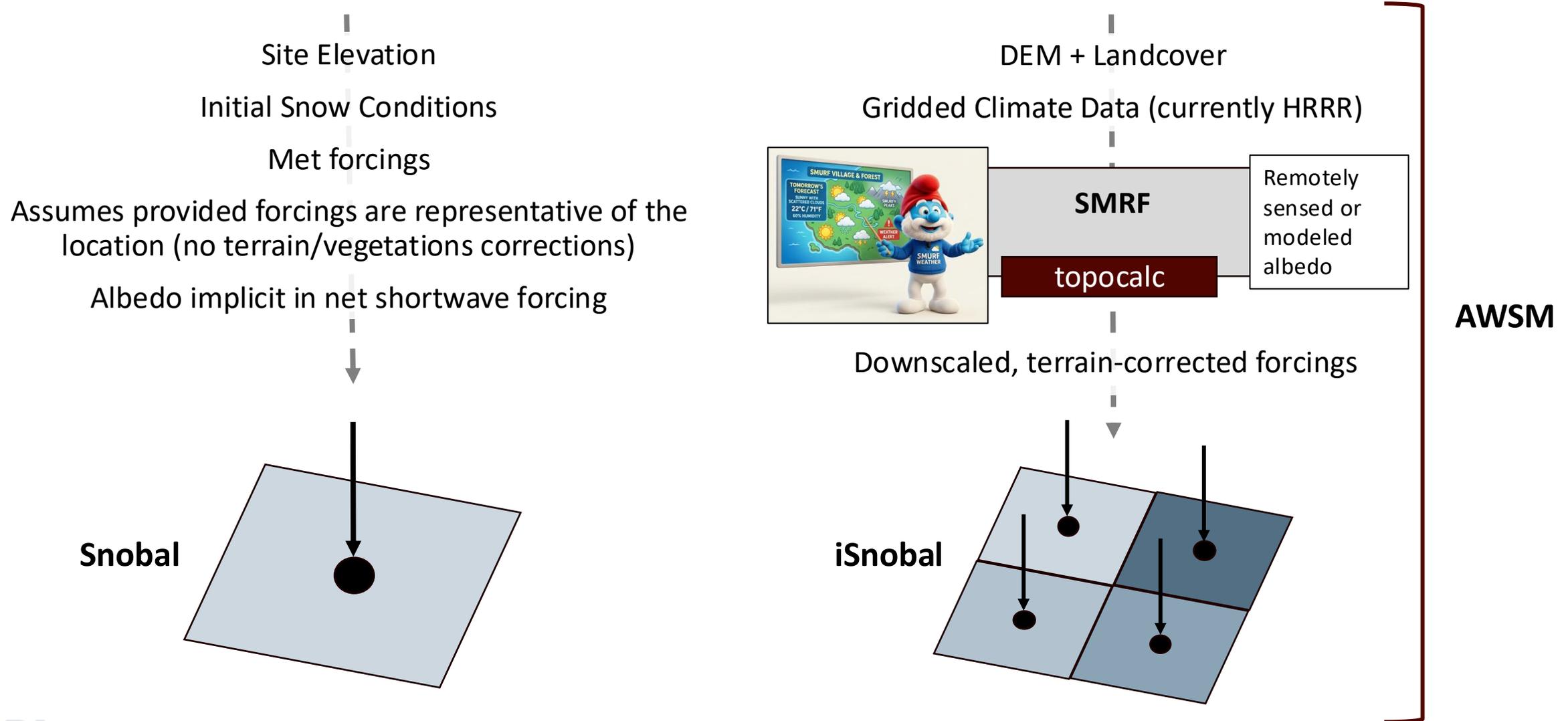


iSnobal, iPySnobal, and AWSM are sometimes used interchangeably to refer to **modeling the snowpack over a grid** using, at the lowest level, iSnobal C binaries.

iSnobal



# Inputs and Forcings



# Revamped PySnobal

- Prior PySnobal version not actively maintained and aging
  - Designed to conform to original Snobal conventions
  - Dependent on outdated Python version; challenging to integrate into modern environment
  - Not readily compatible with MacOS
  - Limited documentation; headerless input/output files
- Features in new release:
  - Uses Python 3.9 and compatible with Linux and Mac
  - Model parameters and io paths are defined in a config file
  - Inputs and outputs have descriptive headers with units
  - Can invoke the model from the command line or by using the PySnobal API
  - Includes basic checks on the input parameters and forcings
  - Modular, readable, and easily customized

<https://github.com/iSnobal/pysnobal>

# Demo

Suppose we have some meteorological data from a station, and we want to model the snowpack...

1. Model Setup
2. Preparing Forcing Data
  - Often need to calculate missing variables, especially precipitation fraction, density, and temp
  - Data needs to be serially complete (no gaps/nans)
  - PySnobal expects specific column names
3. Preparing `config.yaml`
4. Running the model
  - a. Command line interface
  - b. Invoke the `pysnobal.run_snobal` from a python script or Jupyter notebook

## Extracurricular

- Modifying defaults
- Modifying c-source code

## US-Rms AmeriFlux Station

Mountain Big Sagebrush  
Reynold Creek Experimental Watershed, ID  
Elevation: 2111m

