SnowEx-2020 Dataset and Recent Rain-Snow Transition Zone Hydrological Research at the Reynolds Creek Experimental Watershed

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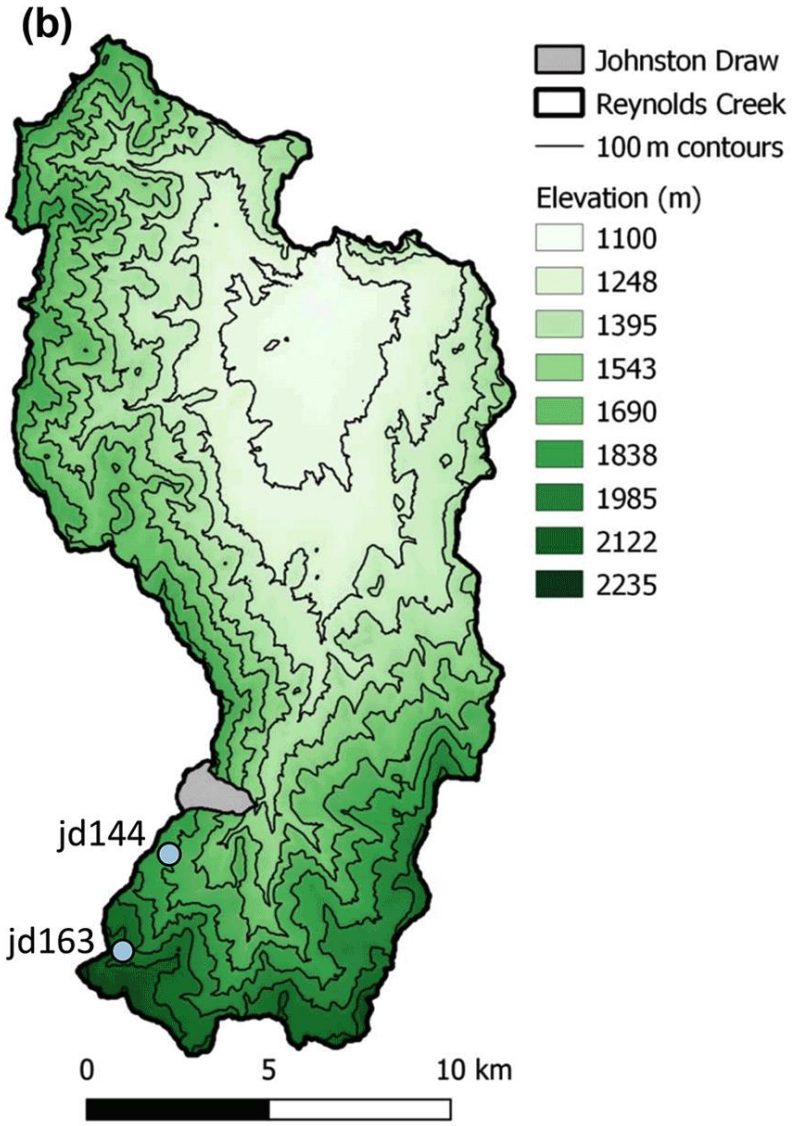
Reynolds Creek Experimental Watershed

- RCEW is located near Boise, Idaho
- Operated by the USDA-ARS Northwest Watershed Research Center (NWRC)
- RCEW has been the focus of research for decades, and was established in 1959



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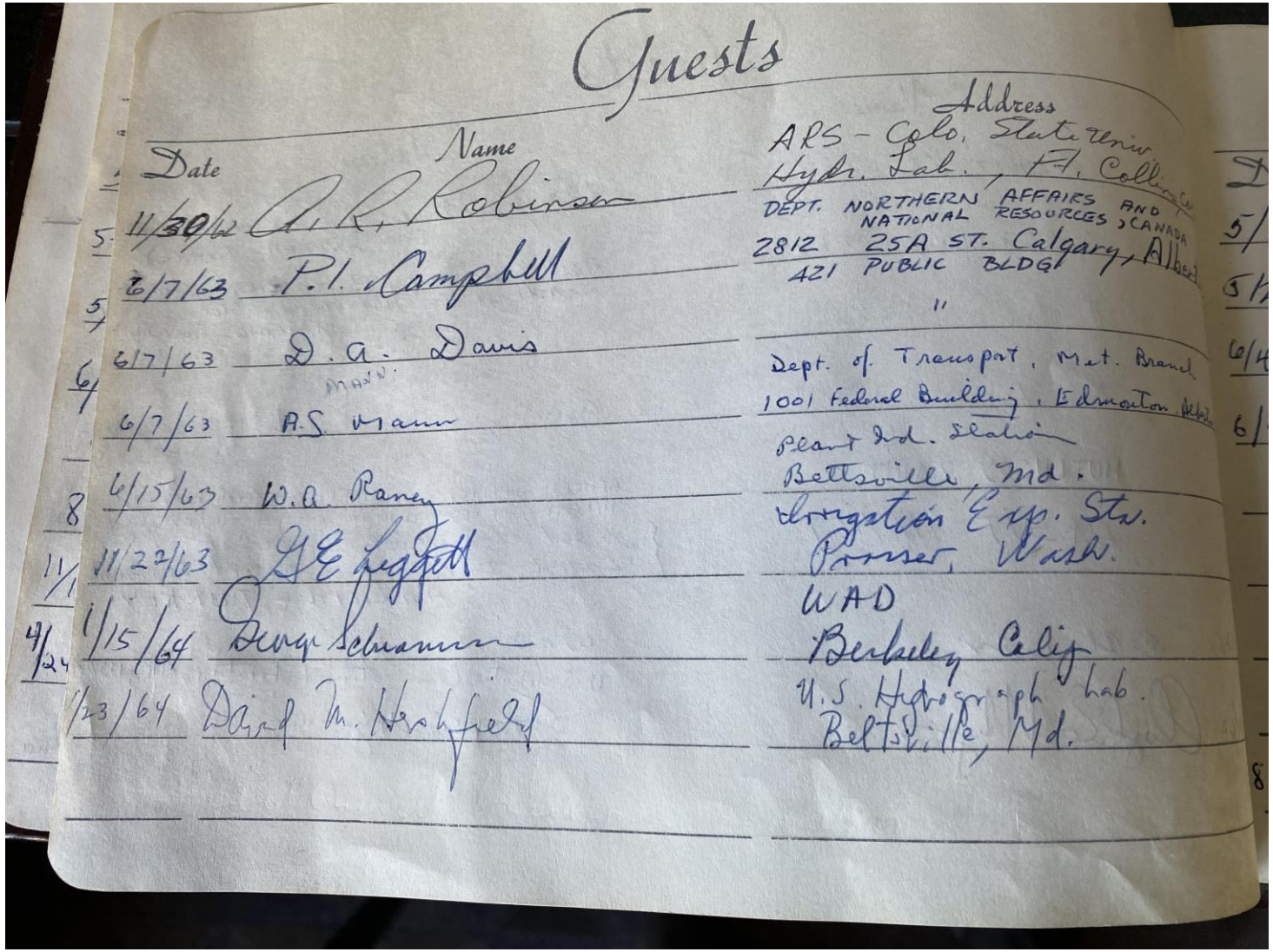
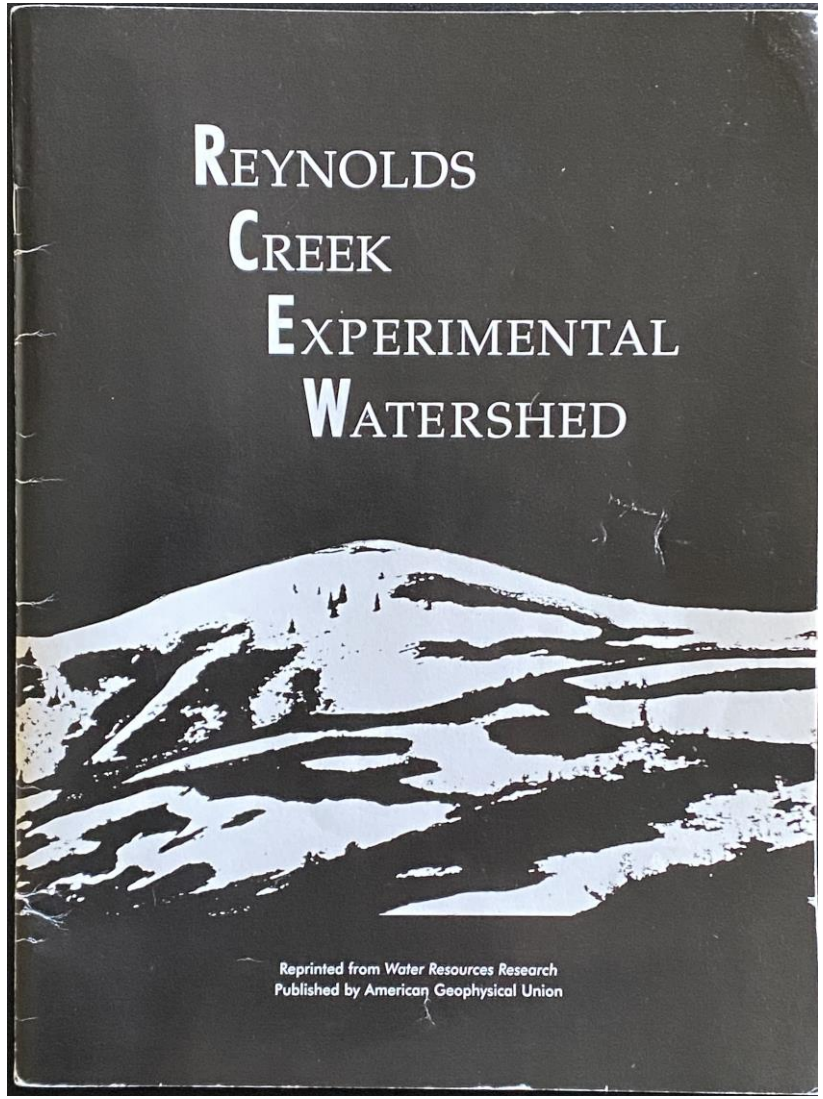
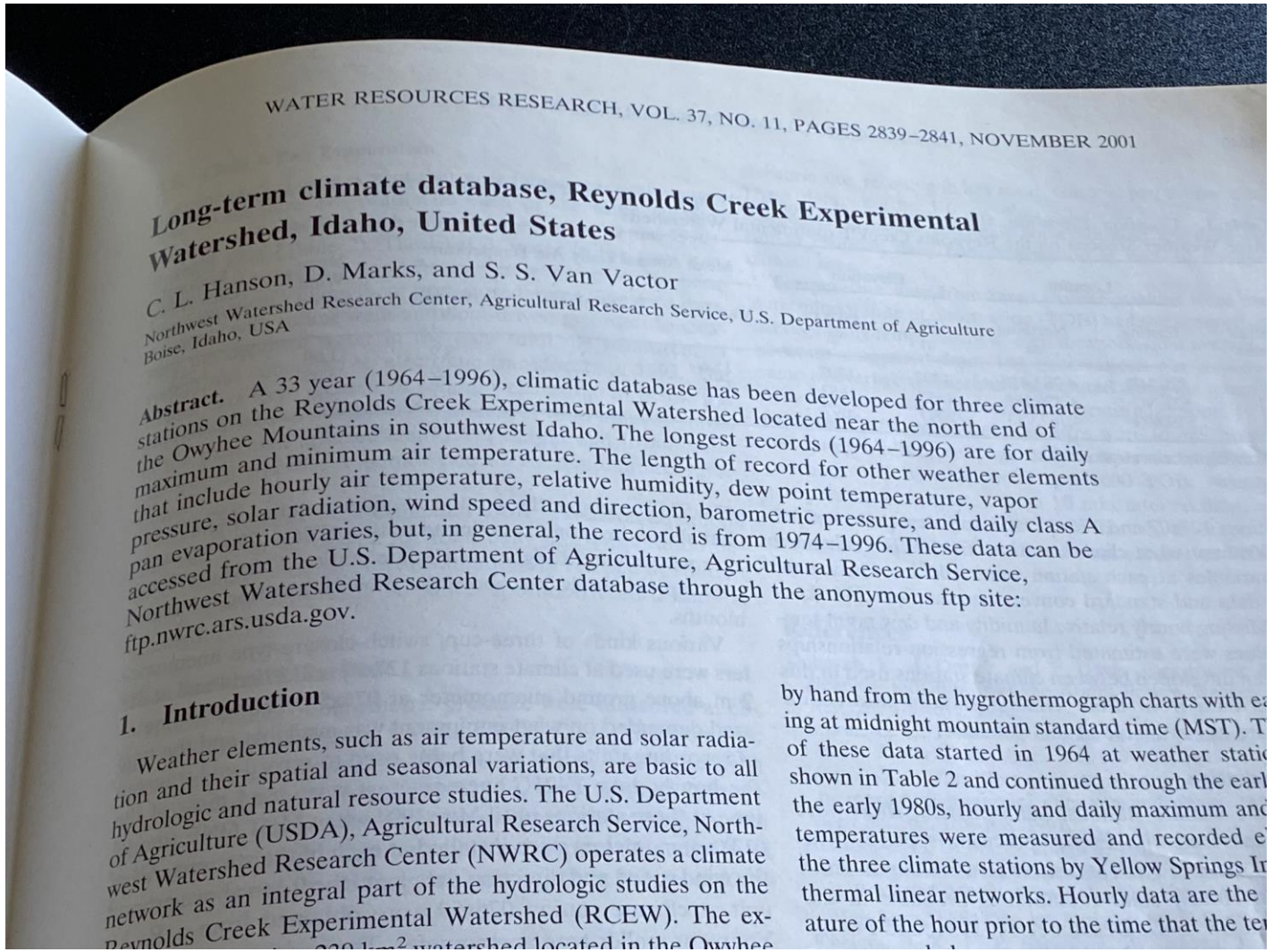


RCEW Measurements





WATER RESOURCES RESEARCH, VOL. 37, NO. 11, PAGES 2839–2841, NOVEMBER 2001

Long-term climate database, Reynolds Creek Experimental Watershed, Idaho, United States

C. L. Hanson, D. Marks, and S. S. Van Vactor
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Boise, Idaho, USA

Abstract. A 33 year (1964–1996), climatic database has been developed for three climate stations on the Reynolds Creek Experimental Watershed located near the north end of the Owyhee Mountains in southwest Idaho. The longest records (1964–1996) are for daily maximum and minimum air temperature. The length of record for other weather elements that include hourly air temperature, relative humidity, dew point temperature, vapor pressure, solar radiation, wind speed and direction, barometric pressure, and daily class A pan evaporation varies, but, in general, the record is from 1974–1996. These data can be accessed from the U.S. Department of Agriculture, Agricultural Research Service, Northwest Watershed Research Center database through the anonymous ftp site: ftp.nwrc.ars.usda.gov.

1. Introduction

Weather elements, such as air temperature and solar radiation and their spatial and seasonal variations, are basic to all hydrologic and natural resource studies. The U.S. Department of Agriculture (USDA), Agricultural Research Service, Northwest Watershed Research Center (NWRC) operates a climate network as an integral part of the hydrologic studies on the Reynolds Creek Experimental Watershed (RCEW). The ex-

by hand from the hygrothermograph charts with ea
ing at midnight mountain standard time (MST). T
of these data started in 1964 at weather stati
shown in Table 2 and continued through the earl
the early 1980s, hourly and daily maximum and
temperatures were measured and recorded e
the three climate stations by Yellow Springs In
thermal linear networks. Hourly data are the
ature of the hour prior to the time that the te

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- 0.38 km^2 snow dominated headwater catchment
- *Elevation range: 2028 – 2137 m*
- 1983-present : Meteorological, soil and snow measurements
- Snow courses during winter at one of the instrument sites adjacent to snow pillow and snow depth sensors
- The two main measurement sites:
  - A sheltered site located within a clearing in an aspen/fir grove near the center of the catchment
  - An exposed site is located on the western catchment divide in an area dominated by mixed sagebrush
- A streamflow weir is located at the outlet of the catchment

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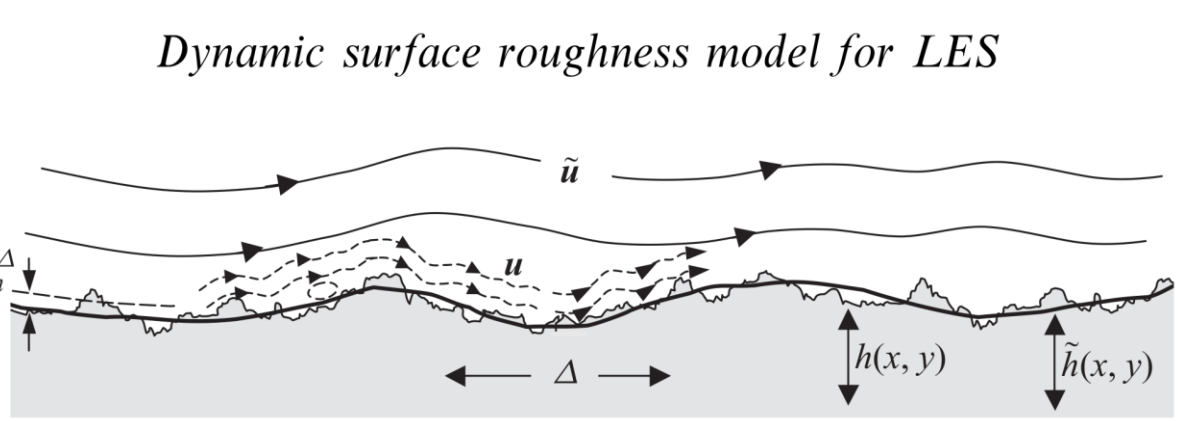
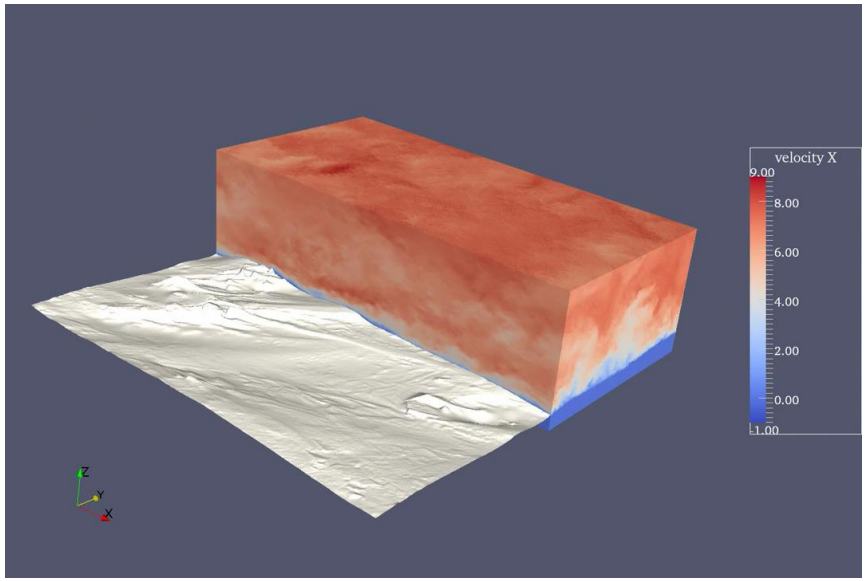
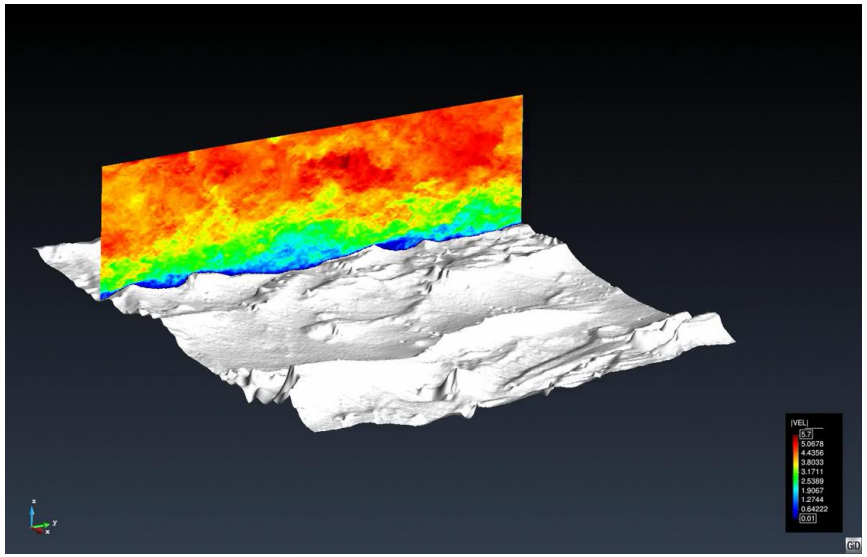
Application: Surface Roughness Characterization – LES Modeling



From Anderson and Meneveau, 2011

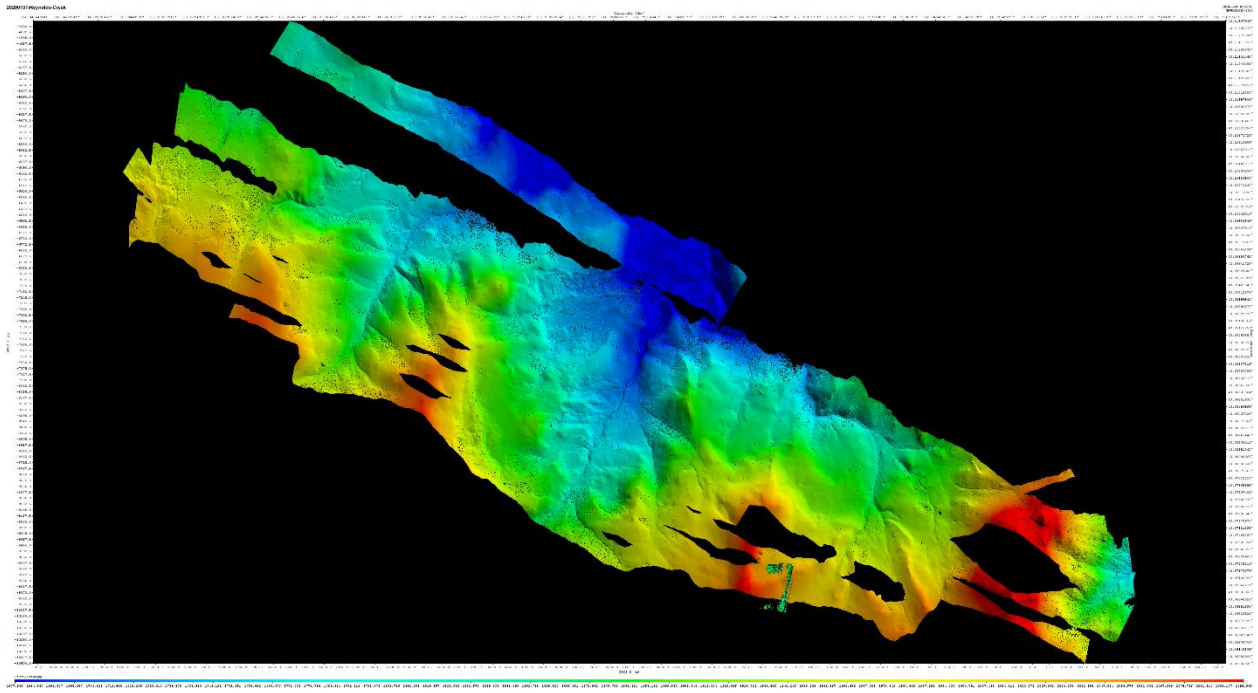
Giometto, Trujillo, Lehning et al. (unpublished)





SnowEx 2020: Additional Datasets

- Three TLS/SfM surveys: January 23-24, February 12-13, and February 26-27
- CRREL Helipod Flight – Friday, January 31^{s}
- SnowEx Fixed Wing lidar Flight, February 18-19
- SnowEx UAVSAR flights on February 13 and February 27, coincident with two of the on-site surveys



Rain-Snow Transition Zone
Johnston Draw iSnobal modeling work

Hydrol. Earth Syst. Sci., 26, 2779–2796, 2022
https://doi.org/10.5194/hess-26-2779-2022

Hydrology and Earth System Sciences
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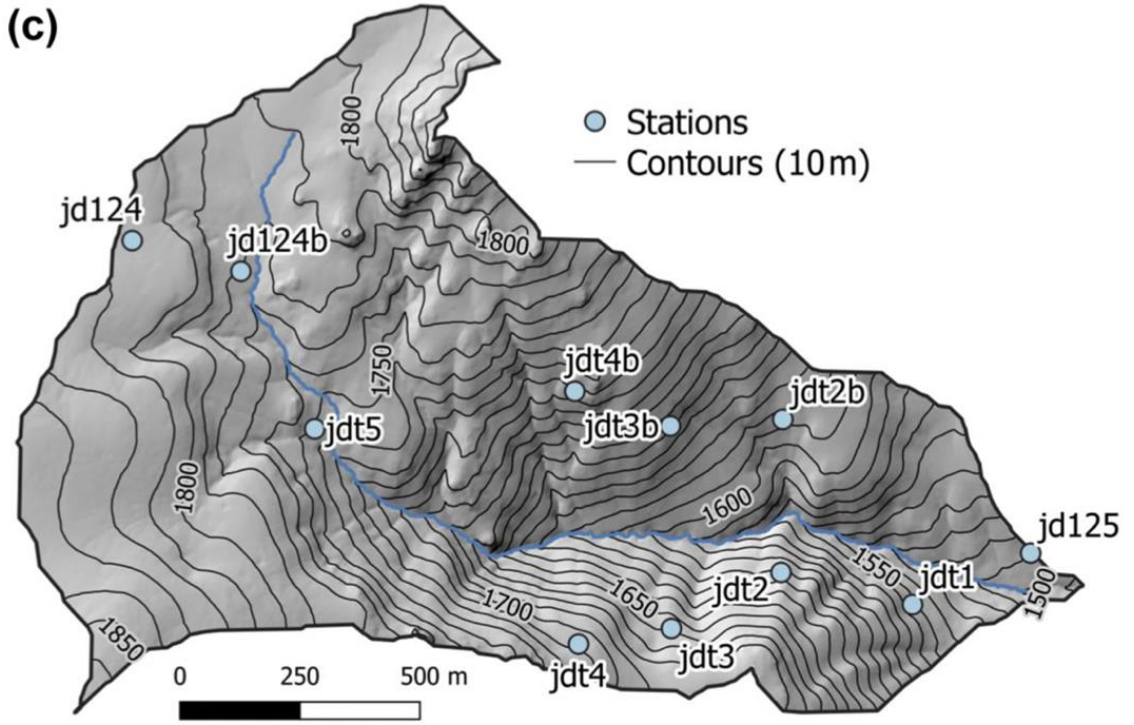
Effects of spatial and temporal variability in surface water inputs on streamflow generation and cessation in the rain–snow transition zone

Leonie Kiewiet[1,2], Ernesto Trujillo[3,4], Andrew Hedrick[4], Scott Havens[4], Katherine Hale[5,6], Mark Seyfried[4], Stephanie Kampf[1], and Sarah E. Godsey[2]

- Hale, K., Kiewiet L., Trujillo E., Krohe C., Hedrick A., Marks D.5, Kormos P., Havens S., McNamara J, Link T., Godsey S.E.: **Drivers of spatiotemporal patterns of surface water inputs in a catchment at the rain-snow transition zone of the water-limited western United States**, J. Hydrol., In Press.

Rain-Snow Transition Zone
Johnston Draw iSnobal modeling work

- Studying the spatial and temporal patterns of surface water inputs (SWI) across 4 hydroclimatically different years
- Johnston Draw: 1.8 km^2, elev. range of 1497 m to 1869 m, MAP ~600 mm
- 2005: rainy, 2010: snowy, 2014: dry, and 2011: wet
- iSnobal: 10-m resolution, hourly timesteps, using a precipitation rescaling approach



Rain-Snow Transition Zone
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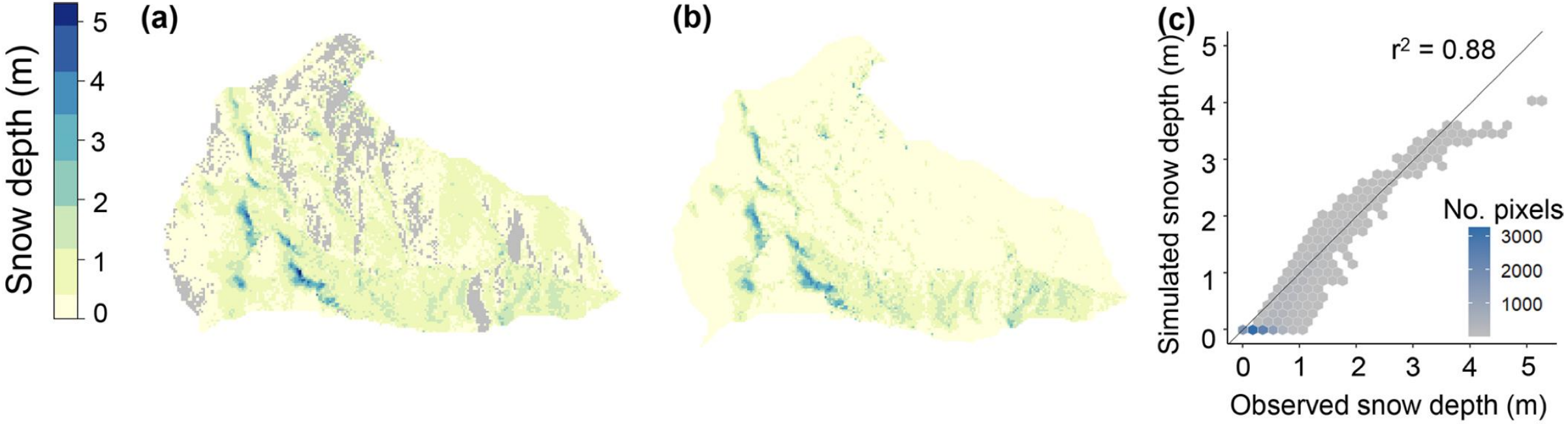
Modeled

Observed



Rain-Snow Transition Zone
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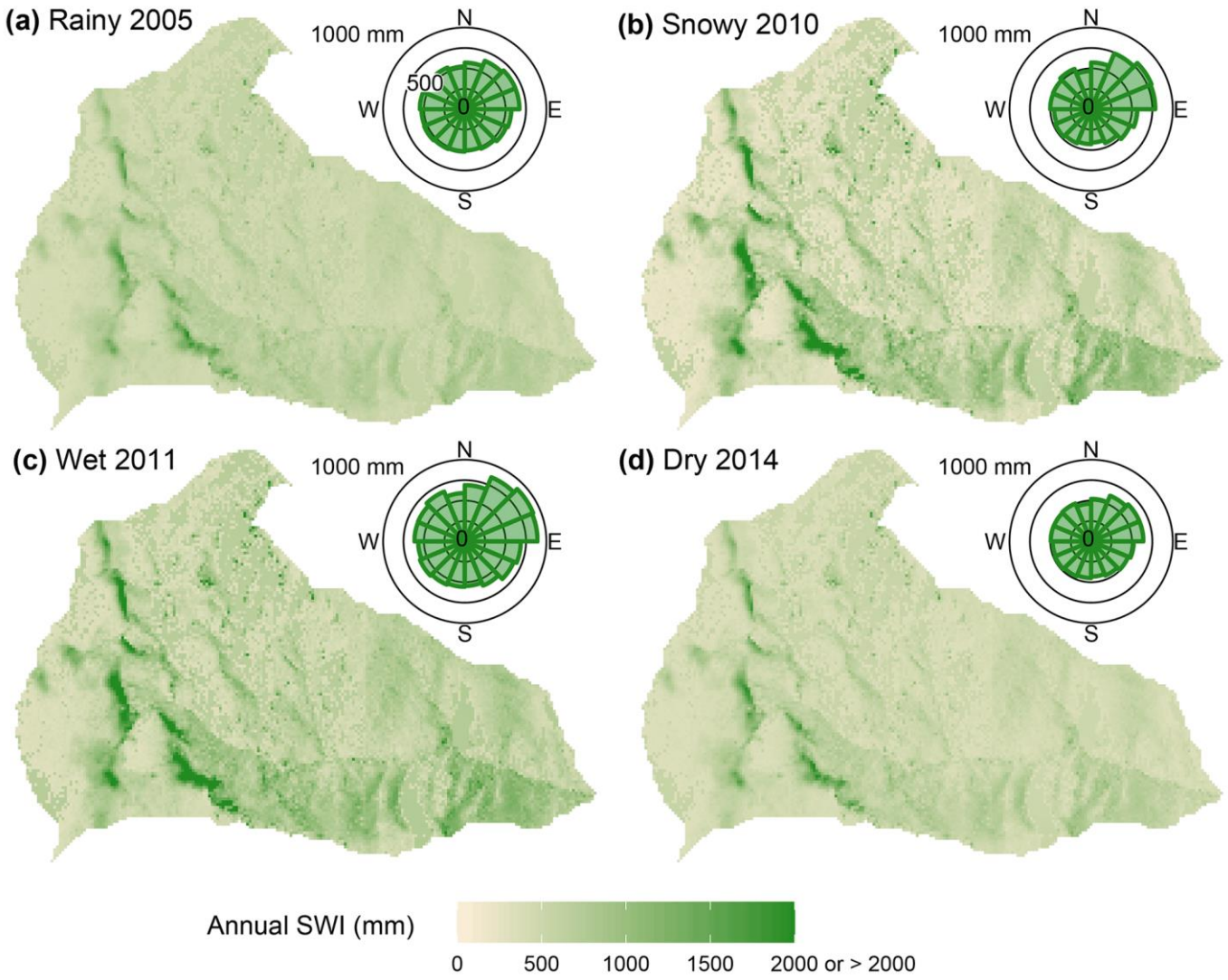

Maps showing the yearly sum of surface water inputs (SWI, mm), with polar diagram insets showing the average sum of SWI per 10 m grid cell for each aspect

Questions?