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✓ Step 2: * presentation type / category
✓ Step 3: * affiliations
✓ Step 4: * authors
✓ Step 5: * sponsors
✓ Step 6: * keywords
Step 7: tables
Step 8: images
✓ Step 9: details
Step 10: proof & submit
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**Abstract Proof**

**CONTROL ID:** 722528

**TITLE:** Snowmelt timing and duration in the Eastern Sierra Nevada based on 10 years of MODIS fractional snow-covered area data

**PRESENTATION TYPE:** Poster Requested

**SECTION/FOCUS GROUP:** Cryosphere (C)

**SESSION:** Recent Advances in Monitoring, Measuring, and Modeling Snow Processes (C10)

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**Title of Team:**

**ABSTRACT BODY:** We analyzed the fraction of area that was snow covered, by 300-m elevation band, in each of the 20 headwater catchments that are part of the Mono and Owens basins in the Eastern Sierra Nevada. These basins range in size from 80 to 310 $km^2$, with snow occurring mainly in an 8-20 km wide area above 1,800 m elevation. This snow-covered area extends over 200 km, from $36^o$ 8' in the south to $38^o$ 17' in the north. The area above 1,800 m elevation is 3,200 $km^2$, about one-third of the total area of the Mono-Owens basin. Our analysis provided estimates of when the snow-covered area was at a maximum, when the snow started melting, how fast it melted and when melt was nearly complete. The fractional snow-covered area (SCA) measured by MODIS was highest above 3,600 m, often over 90%. SCA decreased with elevation, with values in the 1,800-2,100 m elevation peaking well below 50%. In some years SCA at this elevation was barely detectable. Snowcover depletion occurred at average rates of 12-16 m of elevation per day, which is equivalent to each 300-m elevation band melting out 2.2-3.5 weeks later. However, in some years and in some basins, snowcover depletion was as high as 24 and as low as 11 m per day. Higher values generally corresponded to years with later snowmelt and lower values to years with earlier snowmelt. South-facing slopes melted out faster than north-facing slopes. Assuming that snowmelt is sensitive to temperature, and that on average temperature decreases $6^oC$ per 1000 m elevation, each $2^oC$ of climate warming would shift the observed snowmelt patterns upslope by 300 m, or shift the snow-depletion dates in a given elevation band earlier by approximately 3 weeks.

**KEYWORDS:** [1863] HYDROLOGY / Snow and ice.

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