



National Snow and Ice Data Center

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29 October 2015

Dr. Craig Kulesa
University of Arizona
Tucson, AZ 85721 USA

Dear Craig;

I acknowledge that I am identified by name as a collaborator on the investigation entitled 'Phase 2 Development of the HEAT Observatory at Ridge A' that is being submitted by Dr. Craig Kulesa in Response to NSF Program Solicitation (Adv. Tech. & Instr.) and that I intend to carry out all responsibilities identified for me in this proposal. I understand that the extent and justification of my participation as stated in this proposal will be considered during peer review in determining in part the merits of this proposal.

Craig, the proposal looks excellent, and definitely a forerunner to greater radio astronomy science to come from the site. But of course my main interest is the unique climate and atmosphere-snow interactions that occur in the area. Our interests overlap: the extremely dry air, high altitude, and exceptionally thin inversion layer make for some remarkable climate properties. Radiative cooling to space is extremely efficient, creating surface skin temperatures as low as -90°C and lower. As you know, my group and I seek to install modified weather stations and a small tower profiler of the lower atmosphere and upper snow temperature to attempt to record these conditions. As a complimentary study to the atmospheric monitoring you are conducting on the Ridge, we seek to see how the ultra-cold inversion layer pools in adjacent topographic lows, permitting still greater cooling of the surface snow and perhaps creating a 2m thick or thicker layer of $<90^{\circ}\text{C}$ air. Our selected site is just ~ 26 km from PLATO-R / HEAT, and almost directly between the Ridge A instruments and South Pole.

Our group has submitted a RAPID proposal to NASA to fund the modification and preparation of the sensor group we will aim to install, but we require NSF-PLR logistical support to reach Ridge A, and the exceptional sites of ultra-cold austral winter conditions. We are striving to create the lightest, fastest-installing set of weather and snow sensors we can design at reasonable cost.

Collaboration between our studies offers a real chance to explore a true 'edge of the Earth', with atmospheric conditions fully 20°C colder than any in Greenland, and several degrees colder than past record air temperature measurements. Your data on transmissivity, precipitable water, and the record you have of weather conditions will extend our planned results greatly. More important than records, however, is a complimentary understanding of air movement and energy balance between the cold Ridge A and the adjacent local lows, where the near-surface air layer pools.

I think it is clear that there is a unique science opportunity here, combining NASA and NSF resources, and an interest in a unique area of the atmosphere and ice sheet from two different perspectives.

Sincerely,

Dr. Ted Scambos
Senior Research Scientist, and Lead Scientist, National Snow and Ice Data Center



University of Colorado at Boulder