Thermochronology with THE FUSIONS 970 DIODE LASER STEPPED HEATING SYSTEM:
Evaluating the suitability of the Larsen Basin for testing the Cretaceous glaciation hypothesis

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Abstract
We request partial support for a diode laser stepped heating system to make multi-domain diffusion analyses of feldspars from granitoid samples from the Antarctic Peninsula. The results will place constraints on the depth of exhumation of the Antarctic Peninsula and thus will provide volume constrains on the amount of terrigenous material that could have been shed from there into the adjacent Larsen Basin. Preliminary provenance data shows that a substantial fraction of the Larsen Basin's sediment may not have come from the Antarctic Penninsula as previously presumed. Instead it appears to have been derived from the Ellsworth Mountains. This discovery suggests the possibility of glaciation in East Antarctica prior to the conventionally interpreted ca. 34 Ma development of the Antarctic ice sheet. In addition to this specific application it is anticipated that there will be many climate-relevant applications for this system, and it is portable so can be used on the current multi-purpose noble gas system as well as the upcoming new noble gas system. This proposal is linked to another proposal submitted by Winckler and Hemming that would apply this system to step-heating terrigenous-rich samples for the purpose of better constraining the flux of water during Heinrich events using extraterrestrial ^{3}He concentration.