The jovian moon Io provides unique insights into voluminous volcanic processes that were important in the early histories of the terrestrial planets and the Moon. Deriving eruption temperatures of Io’s lavas applies strong constraints on lava composition, the state of Io’s mantle, and the magnitude of tidal heating caused by the evolving orbital resonance between Io, Europa and Ganymede. We have analysed FLIR infrared radiometry thermal emission from the active lava lake at Erta’Ale volcano (Ethiopia) and find that to determine lava eruption temperatures from remote-sensing data, multi-wavelength observations in the visible and short-wavelength infrared have to be obtained no more than 0.1 s apart to overcome the effects of rapid cooling of lava at eruption temperatures, at least with the relatively small lava fountains observed at Erta’Ale. Data at more than two visible wavelengths would further help constrain temperatures. Images with sufficient spatial resolution to separate lava fountains from the quiescent, but still hot, areas of the lava lake are highly desirable. The lack of an atmosphere to inhibit gas expansion enhances lava fountain activity in Io’s active lava lakes, making them prime targets to meet science goals. Data from the Galileo mission show that the activity is so violent that large areas (~1 km²) near the eruption temperatures are exposed. This work was performed at the Jet Propulsion Laboratory – California Institute of Technology, under contract to NASA. © 2011 Caltech. All rights reserved.