The Gamburtsev Subglacial Mountains (GSM) in interior East Antarctica are one of least understood regions on Earth. During the International Polar Year the AGAP expedition sought to characterise cryosphere and lithosphere features in central East Antarctica by comprehensively imaging the GSM province from the ice surface to mantle depths. Here we review some of the major results. Over 120,000 km of new airborne laser, radar, aerogravity and aeromagnetic data were collected. A key finding from radar imaging was the recognition of widespread basal freeze-on over the GSM, which thickens the East Antarctic Ice Sheet, alters the basal heat budget and sub-ice hydrology, and affects the preservation of the oldest ice. Aeromagnetic and gravity data help disclose the underlying crustal architecture and geological evolution of the GSM. Potential field images and models suggest that crustal growth in interior East Antarctica is linked to Precambrian accretion and collisional processes, as opposed to previously proposed Pan-African age suturing. However, the processes responsible for the uplift of the modern GSM are due to significantly more recent events. Continental rifting and intraplate transtensional tectonics have been mapped in the adjacent Lambert Rift region and have been previously associated with Gondwana break-up. We propose that Cretaceous rifting processes also affected the continental interior of East Antarctica and caused significant denudation. Peak uplift was then enhanced by Cenozoic fluvial and fjordal incision and associated isostatic response, a process recognised also in central east Greenland.