

# **AGAP: Exploring the Gamburtsev Subglacial Mountains with Aerogeophysical Surveys during the IPY**

*Michael Studinger<sup>1</sup>, Robin Bell<sup>1</sup>, Fausto Ferraccioli<sup>2</sup>, Detlef Damaske<sup>3</sup>, Carol Finn<sup>4</sup>, David Braaten<sup>5</sup>, Mark Fahnestock<sup>6</sup>, Tom Jordan<sup>2</sup>, Hugh Corr<sup>2</sup>, Stefan Elieff<sup>7</sup>, Carl Robinson<sup>2</sup>, Nick Frearson<sup>1,2</sup>, Dan Geue<sup>7</sup>, Chris McMinn<sup>5</sup>, Beth Burton<sup>4</sup>, Felix Goldmann<sup>3</sup>, Adrienne Block<sup>1</sup>, Martin Bates<sup>7</sup>, Kathryn Rose<sup>2</sup>*

<sup>1</sup>*Lamont-Doherty Earth Observatory of Columbia University, Palisades, New York, USA  
e-mail: [mstudying@ldeo.columbia.edu](mailto:mstudying@ldeo.columbia.edu), +1 845 365 8598*

<sup>2</sup>*British Antarctic Survey, Cambridge, United Kingdom*

<sup>3</sup>*Federal Institute for Geosciences and Natural Resources, Hannover, Germany*

<sup>4</sup>*United States Geological Survey, Denver, USA*

<sup>5</sup>*Center for Remote Sensing of Ice Sheets, The University of Kansas, Lawrence, Kansas, USA*

<sup>6</sup>*Complex Systems Research Center, University of New Hampshire, Durham, NH, USA*

<sup>7</sup>*Sander Geophysics Ltd., Ottawa, Canada*

Exploring the history of the East Antarctic Ice Sheet and lithospheric structure of the Gamburtsev Subglacial Mountains have been primary goals of the International Polar Year. Scientists from seven nations have launched a flagship program to explore a major mountain range buried by a large continental ice sheet and bounded by numerous subglacial lakes. The AGAP umbrella is a multi-national, multi-disciplinary effort and includes aerogeophysics, passive seismology, traverse programs and will be complimented by future ice core and bedrock drilling. We have acquired a major new airborne data set including: gravity; magnetics; ice thickness; SAR images of the ice-bed interface; near-surface and deep internal layers; and ice surface elevation. In total, more than 120,000 km of aerogeophysical data have been acquired from two remote field camps during the 2008/09 field season. Our team will address four fundamental questions: 1) What role does topography play in the nucleation of continental ice sheets? 2) How are major elevated continental massifs formed within intraplate settings but without a straightforward plate tectonic mechanism? 3) How do tectonic processes control the formation, distribution, and stability of subglacial lakes? 4) Where is the oldest climate record in the Antarctic ice sheet? The AGAP education and outreach plans are closely linked to larger IPY education and outreach initiatives leveraging the excitement of “uncovering” a phantom mountain range, larger than the Alps but virtually unexplored since they were discovered during the International Geophysical Year in 1958.