



Finding the missing meteorites of Antarctica

TakeAIM Winner 2018:
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Missions into space are costly, time consuming and often dangerous. Thankfully meteorites - which are extra-terrestrial debris that have survived the passage through the Earth's atmosphere and landed upon its surface - can partially negate the need for space travel by offering insights into the formation of the early solar system and the planets within it.

Of all meteorite finds roughly 66% are discovered within areas of Antarctica called "meteorite stranding zones". In these regions the ice is thrust upwards by obstructions, such as mountains, and strong winds strip away the top layer of ice leaving formerly buried meteorites upon its surface.

Only 0.7% of the meteorites found in Antarctica are iron meteorites - almost eight times less than the percentage found elsewhere. As iron meteorites have high thermal conductivities any energy absorbed (such as sunlight) is quickly transferred throughout the meteorite. This means that the lower surfaces of iron meteorites, unlike those of stony meteorites, heat up rapidly enabling them to melt the ice below them and sink downwards. It is thought that some sink enough as to offset the annual upwards flow of the ice and remain permanently buried.

At Manchester we have developed a mathematical model which predicts that most iron meteorites lie less than 5 cm below the surface of the ice - just waiting to be collected! To this end the first British meteorite collection expedition to Antarctica will take place in 2019/2020. Hopefully this will be the first of many successful meteorite finding missions to come.

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The Smith Institute, enabled by the generous sponsorship of our leading corporate partners, ran the TakeAIM competition in 2018 to make visible the crucial role that mathematics will increasingly play in all aspects of our lives. The competition was open to undergraduate and postgraduate students working in the mathematical sciences. First prize was £1,250 of Apple vouchers, with nine runners-up each receiving £100 of Amazon vouchers.