

Opportunities for Statistical Applications in Planetary Science

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Planetary science provides many potential applications of statistical techniques. This oral paper will cover some of these applications. We will identify example areas where the results have been less successful or untried, as opportunities for collaborative research in statistics between mathematicians and planetary scientists. As an example, one of the most common applications of statistics in planetary science is in the study of impact cratering. Craters provide an essential link for comparing the geologic histories of the planets. How can we distinguish between a random distribution of impact craters on a sphere and one that has real differences in population density? How do we relate impact crater density to absolute age on planetary surfaces? Answers require statistical understanding of the processes, material properties and the nature or evaluation of random distributions in time and space. Problems also include the nature of the impacting objects and how their distribution evolves with time. Statistical evaluation of observation error is also important. We will discuss problems where new understanding of statistical methods is needed in planetary science.