

AGE OF POPIGAI IMPACT EVENT USING THE ^{40}Ar - ^{39}Ar METHOD

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The Popigai impact structure of central Siberia is the largest known impact crater in the Commonwealth of Independent States with an original diameter of some 100 km. The age of the crater is constrained by the existing stratigraphy to a period between 5-65 Ma (1). Attempts to date the impact event using conventional K-Ar on whole rock samples and fission track dating on glasses yield a spread of ages between 30 and 45 Ma (1-4). Argon step-heating analyses of several whole-rock samples performed with the Argon Laserprobe at the University of Toronto indicated an age of impact of about 36 Ma (5). However, a more recently reported ^{40}Ar - ^{49}Ar result on glass separated from a suevite sample gave a 65 Ma age (6) and raised the possibility that Popigai was involved with the K/T boundary event. We have pursued further analyses at the University of Toronto on a broader spectrum of Popigai samples. These results confirm an age of about 36 Ma for the formation of this crater, and indicate that Popigai was not associated with the K/T boundary event.

We now have a total of 10 step-heating runs on a five different samples. These runs displayed several types of spectral shapes including plateaux. These assorted spectral shapes are common in melt rock morphologies and are indicative of the complex interaction of the different argon reservoir sites in these rocks (7).

Of the five different Popigai samples, two display horizontal plateaux on an age spectrum plot, two others display a step-wise rising pattern to a final age consistent with the plateaux age found in the previous samples, while the fifth sample gives a plot which oscillates around the approximate plateaux age with higher ages in the lower temperature fractions and lower ages in the higher temperature steps. All of these patterns are consistent with a resetting of the argon clock between 35-36 Ma ago. A simple average of the appropriate plateau fractions gives an estimate of the age of the Popigai impact event of 35.7 +/- 0.8 Ma. Thus analysis of whole rocks (as opposed to glass from suevites) indicates that Popigai was not associated with the K/T boundary event.

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