

## **Crustal evolution of the Markha terrane, Siberian Craton: Evidences from U-Pb, Hf- and O-isotope data for zircons from the Nakyn kimberlites**

IRINA TRETIKOVA<sup>1</sup>, ELENA BELOUSOVA<sup>1</sup>,  
WILLIAM GRIFFIN<sup>1</sup>, VLADIMIR MALKOVETS<sup>2</sup> AND  
NORMAN PEARSON<sup>1</sup>

<sup>1</sup>ARC Centre of Excellence for Core to Crust Fluid Systems (CCFS) and GEMOC, Dept. of Earth and Planetary Sciences, Macquarie University, Sydney, Australia

<sup>2</sup>The Pheasant Memorial Laboratory for Geochemistry & Cosmochemistry, Institute for Study of the Earth's Interior, Okayama University, Misasa, Tottori, Japan

The Nakyn kimberlite field is located within the Markha terrain in the eastern part of the Siberian Craton, in the Vilui-Markha deep fault zone. The field contains only four kimberlitic pipes; however all of them are diamondiferous including Nurbinskaya pipe - one of the most diamond-rich kimberlites of the Craton.

The U-Pb age of zircons from Nurbinskaya and Malo-Botuobinskaya pipes reveals two main peaks – 2.6-2.8 Ga and 370-380 Ma. The youngest age interval correlates well with the age of kimberlites as previously determined by Rb-Sr technique [1].

At the same time Lu-Hf model ages for the youngest population of zircons show consistent  $T_{(DM)}$  model age of 2.2-2.3 Ga and  $T_{(DM)}$  crustal model age of 3.25-3.55 Ga. The values of  $\epsilon_{Hf}$  are fall in the narrow range from -31.1 to -35.9 which is extremely low for kimberlite zircons. These old model ages are also confirmed by similar U-Pb ages obtained for 4 grains at 2.34 Ga and a single grain with age of 3.75 Ga. For the young population the average  $\delta^{18}O$  is 5.7‰.

Thus, using both U-Pb dating and Lu-Hf model ages the history of crustal evolution of the Markha terrain could be reconstructed. The oldest age interval 3.5-3.7 Ga is related to the first stage of crust formation. Then this primary crust was re-worked 2.6-2.8 Ga ago and again at the 2.3 Ga. The last event is probably related to the formation of the Markha terrain itself at 2.3-2.5 Ga [2]. The youngest U-Pb ages reflect the magmatic event just before and at the time of kimberlite eruption at the Nakyn field.

[1] Agashev, Watanabe, Bydaev, Pokhilenko, Fomin, Maehara & Maeda (2001) *Geology* **29**, 267-270 [2] Rosen & Fedorovsky (2001). *Transactions of GIN RAS*, 188 pp. (in Russian).