TIMING AND CHARACTERISTICS OF MARE VOLCANISM ON THE FARSIDE AND IN THE CENTRAL REGION OF THE PKT REVEALED BY KAGUYA. T. Morota[1], J. Haruyama[2], M. Ohtake[2], Y. Ishihara[2], Y. Cho[3], S. Kato[1], H. Hiesinger[4], and LISM working group, [1]Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan (morota@eps.nagoya-u.ac.jp), [2]Japanese Aerospace Exploration Agency, Japan, [3]Rikkyo University, Japan, [4]Westfälische Wilhelms-Universität Münster, Germany.

Introduction: Unraveling the timing of mare volcanism on the Moon is essential for understanding its thermal evolution. Using image data from orbital satellites, a considerable number of maria have been dated by crater size-frequency distribution mesurements [e.g., 1-5]. Using Kaguya data, we have also performed crater counting on mare deposits in the South Pole-Aitken (SPA) basin and in the Feldspathic Highland Terrane (FHT), as well as on young basalts in the Procellarum KREEP Terrane (PKT) [6-10]. Here we review our findings.

Farside Mare Volcanism: Our model ages of farside mare deposits indicate that mare volcanism on the farside began at least as early as 3.9 Ga and continued until ~2.0 Ga (Fig. 1) [6, 7, 9, 10]. From a comparison of model ages in the FHT and the SPA basin, we found that mare volcanism in these regions ended at the same time, suggesting that the SPA basin forming impact might have had only a minor effect on mare volcanism in the region [9]. The total volume of mare basalts in the Moscoviense basin is estimated to be 9,500–16,000 km^3 [7]. From a comparison with that within a same-sized nearside basin, we found that magma production in the farside mantle was 3–10 times less than that of the nearside, consistent with previous estimate [11].

Mare Volcanism in the PKT: The latest mare eruption on the Moon occurred within the PKT [e.g., 2]. Model ages of mare basalts in the region indicate that mare volcanism in this region continued until ~1.5 Ga (Figs. 1 and 2) [2, 7]. Hiesinger et al. [2] found a possible peak of volcanic activity at ~2.0 Ga on the basis of their model ages. Our model ages also reveal the existence of this peak more clearly (Fig. 2) [8].

References: [1] Hiesinger H. et al. (2000) *JGR*, *105*, 29239–29275. [2] Hiesinger H. et al. (2003) *JGR*, *108*, doi:10.1029/2002JE001985. [3] Hiesinger H. et al. (2010) *JGR*, *115*, doi:10.1029/2009JE003380. [4] Whitten J. et al. (2011) *JGR*, *116*, doi:10.1029/2010JE003736. [5] Pasckert J.H. et al. (2015) *Icarus*, *257*, 336-354. [6] Haruyama J. et al. (2009) *Science*, *323*, 905–908. [7] Morota T. et al. (2009) *GRL*, *36*, doi:10.1029/2009GL040472. [8] Morota T. et al. (2011) *EPSL*, *302*, 255–266. [9] Morota T. et al. (2011) *EPS*, *63*, 5–13. [10] Cho Y. et al. (2012) *GRL*, *39*, doi:10.1029/2012GL051838. [11] Wieczorek M.A. et al. (2001) *EPSL*, *185*, 71–83.

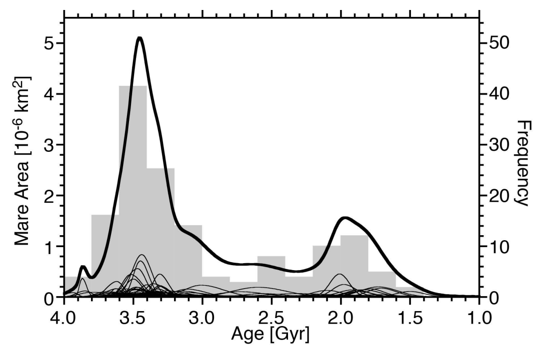

Fig. 2. Age distribution of mare basalts in the PKT [2, 8]. Each Gaussian represents a single basalt unit. The width of the Gaussian corresponds to the age uncertainty. Each Gaussian has an area weighted by its unit area. The thick curve is created by summing the Gaussians. The histogram of mare basalt ages is also shown.

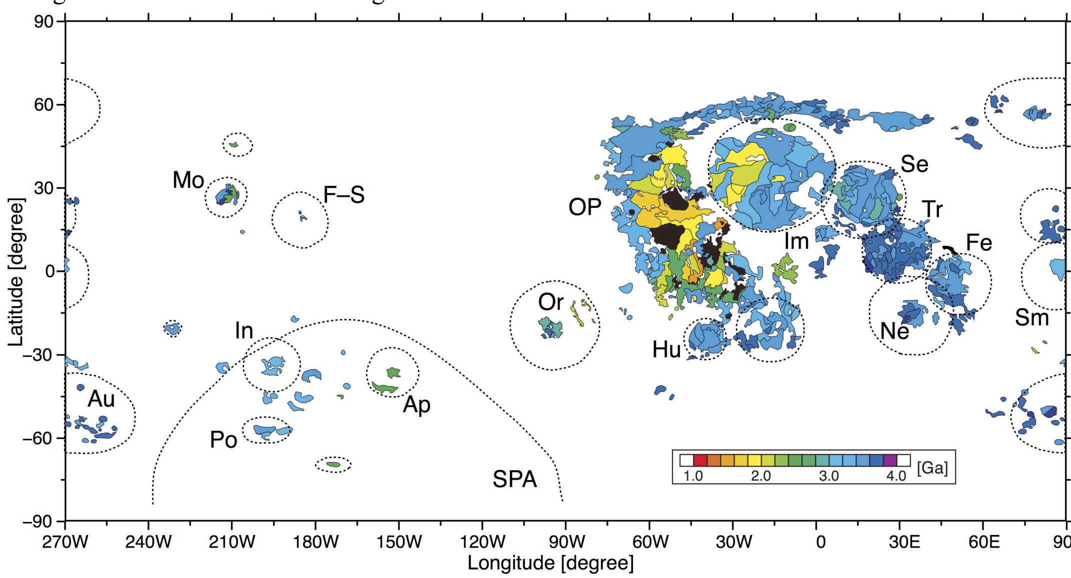

Fig. 1. Model ages of mare basalts [1-3, 6-10]. Ap, Apollo; Au, Australe; Fe, Fecunditatis; F–S, Freundlich–Sharonov; Hu, Humorum; Im, Imbrium; In, Ingenii; Mo, Moscoviense; Ne, Nectaris; OP, Oceanus Procellarum; Or, Orientale; Po, Poincare´; Se, Serenitatis; Sm, Smythii; SPA, South Pole–Aitken; Tr, Tranquillitatis.