

## SAR arc at 68° geomagnetic (71° geographic) North for Kp = 0+

\*Shin-ichiro Oyama<sup>1,2,3</sup>, Atsuki Shinbori<sup>1</sup>, Anita Aikio<sup>2</sup>, Heikki Vanhamaki<sup>2</sup>, Yasunobu Ogawa<sup>3</sup>, Mirjam Kellinsalmi<sup>4</sup>, Tero Raita<sup>2</sup>, Mike Rietveld<sup>5</sup>, Kazuo Shiokawa<sup>1</sup>, Ilkka Virtanen<sup>2</sup>, Lei Cai<sup>6</sup>, Abiyot Workayehu<sup>2</sup>, Marcus Pedersen<sup>2</sup>, Kirsti Kauristie<sup>4</sup>, Boris Kozelov<sup>7</sup>, Andrei Demekhov<sup>7</sup>

1. Institute for Space-Earth Environmental Research, Nagoya University, Japan, 2. Space Physics and Astronomy Research Unit, University of Oulu, Finland, 3. National Institute of Polar Research, Japan, 4. Finnish Meteorological Institute, Finland, 5. EISCAT, Norway, 6. KTH Royal Institute of Technology, Sweden, 7. Polar Geophysical Institute, Russia

Stable Auroral Red (SAR) arc has been studied for more than half century since its academic discovery in Southern France in 1958 as one of the typical optical features occasionally seen at subauroral latitudes. Generation mechanism of the SAR arc is related to storm-time interactions at the overlapped region between the plasmasphere and the ring current. Thus most events have been found out of the auroral oval such as ~60 deg in geomagnetic latitude. In this study, however, we will present a SAR arc event at 68 deg geomagnetic (71 deg geographic) north in the Scandinavian sector during period of geomagnetically quiet condition of Kp = 0+. The SAR arc, which was captured with cameras (630 nm) at Abisko and Kirpisjärvi, appeared coinciding with a pseudo substorm onset at 71-72 deg geomag. N and rapid equatorward expansion of the polar cap potential estimated with the SuperDARN. However, the SAR arc disappeared in about 7 minutes along with a sudden shrinking of the polar cap potential. Conjunction measurement with the Swarm A/C suggests that the SAR arc was located at poleward slope of the ionospheric trough or slightly its outside. These experimental evidences suggest that, in the early stage of this SAR arc generation, the magnetosphere compressed the ring current region inward, resulting in a contact of the ring current region to the plasmasphere but expansion of the polar cap potential was too short to coalescent the ring-current hot ions and plasmaspheric electrons at the plasmopause, which corresponds to the trough minimum in the ionosphere.

Keywords: SAR arc, geomagnetically quiet period, Ionosphere