Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PPS21-14 会場:304 時間:5 月 20 日 14:30-14:45

3次元FDTD法によるRosetta/CONSERTレーダトモグラフィ観測シミュレーション
3D FDTD simulation of Rosetta/CONSERT radar tomography observation

小林 敬生 [1*]
Takao Kobayashi[1*]

[1] 韓国地質資源研究院
[1]Korea Institute of Geoscience and Mineral Resources

Rosetta is a comet exploration project of ESA which aims to approach Comet 67P/Churyumov-Gerasimenko in 2014. It carries various onboard missions, one of which is a radar tomography mission called Comet Nucleus Sounding Experiment by Radiowave Transmission (CONSERT). CONSERT consists of two radar systems on the Rosetta platform and on the Philae lander, and is to perform bi-static radar sounding observations by using CONSERT transmits radar pulses of which the center frequency is 90 MHz.

We built a 3D simulation code based on Finite Difference Time Domain (FD-TD) algorithm. It simulates CONSERT observation in which the Philae lander transmits radar pulses and the Rosetta platform received them. The Philae radar transmitter is approximated by a point current source whose pulse shape is a differentiated Gaussian. Received echo at the Rosetta platform was approximated by the electric field at the receiving point, which was calculated by based on Near-to-Far-Field conversion algorithm. The comet nucleus model is represented by spatial distribution of dielectric constant in the simulation space.
The simulation results are utilized in developing the tomography imaging algorithm.

キーワード: Rosetta, CONSERT, レーダ, トモグラフィ, FDTD, シミュレーション
Keywords: Rosetta, CONSERT, radar, tomography, FDTD, simulation