Subplinina and vulcanian explosions were repeated with a lava dome growth in the eruption of Kirishima Volcano which began since January 2011. Geological monitoring result is shown here. Phreatic explosions had been repeated at Shinmoedake since August 2008 and inflation (~7 million m³) had been observed by the GPS network for one year before the eruption. Products of the phreatomagmatic explosion on 19 January 2011 contained ~10 % of juvenile pumice. An explosive phase began on 26 January; subplinian explosions were repeated during the first three days, depositing ~10 million t of tephra. On 28 January, a small lava dome appeared on the crater floor nearby the vent of 200 m across for the subplinian explosions. It continued its growth up to ~500 m across (~5 million m³) only for 3 days. The growth of lava dome was observed by ALOS images, suggesting the explosion vent fully covered by the dome. At the night of 31 January, >1,000 people who live along the possible course of pyroclastic flows were ordered evacuation due to a possibility of a plinian explosion. A vulcanian explosion occurred on 1 February, destroying a part of the dome. Pumice of this eruption ranges from 57 to 62 % in SiO₂ showing mingling of two magmas with different colors. The progress of this eruption is similar to that in the early stage of the 1716-17 eruption at this volcano, which ended with the plinian eruption following the 3-months explosive phase and 7-months dormancy.