



Topographic and geologic analysis of the Pre-selection landing sites for Chang 'E 5(CE-5) lunar sample returning mission of China

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China Lunar Exploration Program has successfully launched 3 missions since the year of 2007: CE-1(2007), CE-2(2009), and CE-3(2013), and it is planning to launch two lunar Landers in the upcoming years- CE-5(2017) and CE-4(2020). Few decades after the last lunar sample returning mission, CE-5 will be the first lunar sample returning mission in the 21 century. The Pre-selection landing site of CE-5 will be located at a geographic extent of: 41 degrees to 45 degrees north latitude and 49 degrees to 69 west longitude, which lies in the near side of the moon, the north-east of the Oceanus Procellarum, to the west of Monte Jura and to the north of Monte Rümker. To ensure the safety of the CE-5 Lander and get lunar samples with more scientific interest, it is essential to take an investigation from the research aspects of topography and geology to select optimal precise landing sites from the Pre-selection area. From the topography aspect, the safety of the Lander is greatly involved with the rugged terrain, conditions of solar illumination and necessity of direct radio communication with the Earth. We present the method of precise landing sites selection using CE-2 high resolution lunar topographic data, which is based on geographical information systems (GIS) technologies to perform analysis, utilizing the criteria of surface suitability for landing, such as slopes, waviness, craters distribution, illumination conditions and Earth visibility. In addition, the scientific interest is related to the complexity of the geological conditions, so that estimations of geological background based on USGS lunar geology map data were used to evaluate landing site candidates on possible lunar volcanic materials. The method gave us 7 possible candidates to land, which are around the location of 55°W , 43°N . In the further research, the main parameters of these possible sites will be presented with possible prioritization based on both technical requirements and scientific interest.