



Predicting thunderstorms, lightning and sprites for global observations from the International Space Station

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The THOR experiment on the International Space Station (ISS) was conducted by Danish astronaut, Andreas Mogensen, during September 1-10, 2015. The aim was to observe over-shooting cumulonimbus turrets, lightning and TLEs with an optical camera through the windows of the PIRS module. To maximize the chances of success, we developed a strategy to predict locations of thunderstorm targets up to three days in advance. The long lead-time was required by the astronaut activity planners that attempted to accommodate many experiments during a short time. The prediction strategy relied on the methodology developed for the MEIDEX experiment on board the space shuttle Columbia (in 2003) and later refined for JAXA's Cosmic Shore campaign from the ISS (in 2011). New and additional components were added to the forecast that enabled us to distill and prioritize a daily target-list with specific viewing angles computed relative to the ISS position and attitude. We present results of the verification procedure for the thunderstorm forecasts, using WWLLN data for selected regions and times during the mission, when high-priority targets were identified as suitable for observation. The methodology proves to be accurate and reliable and can be replicated in future space-based campaigns.