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Introduction: A density depletion region is formed on the Moon's nightside when the solar wind interacts and flows past the lunar surface, which acts as a diamagnetic obstacle removing plasma from the solar wind. To examine the formation of the Moon's wake-tail and the refilling of the density depletion region, a high resolution 3D global hybrid simulation is used. The hybrid simulation (particle ions, fluid electrons) uses realistic spatial scales for the lunar obstacle and the system size. The tail refilling process on the Moon's nightside can be described approximately by a plasma expansion into a vacuum driven by the thermal motion of particles along the interplanetary magnetic field lines. Electric fields created due to the pressure gradient at the edge of the density cavity further accelerates ions into the density depletion region and anisotropic distribution functions are formed. These anisotropic ion distribution functions lead to the generation of electromagnetic waves near the ion cyclotron frequency along the length of the wake-tail further downstream. A density increase at the center of the plasma depletion region also tends to form downstream where the ions beams from either side of the cavity meet and interact. Results will be compared with data from Wind when the satellite made flybys through the Moon's wake tail.