Probing Episodic Accretion Process in Very Low Luminosity Objects

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We present ALMA observations of N2H+ and CO isotopologues to probe the episodic accretion process toward eight Very Low Luminosity Objects (VeLLOs). Due to the presumed intervals between accretion bursts (~5000-50000 yr), episodic accretion process is difficult to be directly detected through measuring the variation of the accretion rates. Chemical signature provides us an indirect way to probe the episodic accretion process. During the accretion burst, the increasing luminosity (accretion luminosity) would evaporate CO within a larger radius, and the gaseous CO could destroy N2H+ via chemical reaction. Because CO takes ~10,000 yr to refreez-out onto the dust grains, it allows us to probe a recent accretion burst by comparing the observed CO sublimation radius to the dictated radius with the current luminosity (<200 a.u for our target VeLLOs with Lbol < 0.45 Lsun). Among our eight targets, three show clear N2H+ depletion and large CO evaporation radius and other three show either N2H+ depletion or large CO evaporation radius. The fraction of VeLLOs with accretion burst signatures is comparable to that of Class 0 young stellar objects. Our result suggests that the accretion process in VeLLOs is similar to that in normal Class 0 objects.