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Small-Scale Waves and Wave-Like Features in Jupiter's Atmosphere Detected by JunoCam

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Within the first 26 orbits of the Juno spacecraft around Jupiter, we have identified a variety of wave-like features in images made by its public-outreach camera, JunoCam. Because of Juno's unprecedented and repeated proximity to Jupiter's cloud tops during its close approaches, JunoCam has detected more wave structures than any previous surveys. Most of the waves appear in long wave packets, oriented east-west and populated by narrow wave crests. Spacing between crests were measured as small as ~30 km, shorter than any previously measured. Some waves are associated with atmospheric features, but others are not ostensibly associated with any visible cloud phenomena and thus may be generated by dynamical forcing below the visible cloud tops. Some waves also appear to be converging and others appear to be overlapping, possibly at different atmospheric levels. Another type of wave has a series of fronts that appear to be radiating outward from the center of a cyclone. Although we have detected wave-like phenomena covering latitudes between 20°S and 45°N, most appear within 5° of latitude from the equator. Most waves appear in regions associated with prograde motions of the mean zonal winds. Although Juno was unable to measure the velocity of wave features to diagnose the wave types due to its close and rapid flybys, both by our own upper limits on wave motions and by analogy

with previous measurements, we expect that the waves JunoCam detected near the equator are inertia-gravity waves.