Relative Rounding in Toric Geometry

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Attached to a toric variety X is a topological space X_{log} on which polar coordinates are well-defined. There is a natural map $X_{log} \to X$, which is a kind of real blowing up and can greatly simplify singularities: X_{log} is a manifold with boundary. This technique applies also to equivariant *mappings* between toric varieties. Our main result says that if $f\colon X \to Y$ is an a locally exact equivariant mapping of toric varieties, then the associated map $f_{log}\colon X_{log} \to Y_{log}$ is a topological submersion whose fibers are orientable manifolds with boundary. This result can be globalized using the language of logarithmic geometry, and a similar statement holds for exact log smooth maps of log analytic varieties. The proof depends on a new look at the moment mapping (inspired by Birch's theorem in statistics) and a way to "force" its functoriality. This is joint work with Chikara Nakayama.