Net mass loss from global Mountain Glaciers and Ice Caps (MGIC) is presently 59% of the global land ice total contribution to sea level rise. Evaluation of MGIC mass change is complicated by the very large number (potentially as many as 400,000) of individual ice bodies, their wide distribution, lack of adequate observations, and lack of basic inventory data in some of the world’s most active MGIC systems, for example in Alaska and among the peripheral ice bodies surrounding the Ice Sheets. Robust projections of future sea level requires evaluation of all sources of eustatic sea level rise. While the ice sheets will eventually dominate sea level rise by virtue of their greater reservoir size, it is unclear when their greater reservoir size will become relevant. At present, MGICs are the dominant land ice contributor to sea level. One critical question is when this relationship will reverse and the ice sheets become the greater term. We present strategies for projecting aggregate MGIC volume changes using power-law scaling relationships and statistical physics. Scaling relationships are valid in non-steady state conditions and account for the varying response times of both larger and smaller MGIC. Theoretical knowledge of statistical distributions, supplemented by data from regions where inventories are complete, can be used to extend MGIC inventories in regions where they are currently incomplete.