The distortion of a subgroup measures the difference between lengths in the subgroup and lengths in the group. Higher-order analogues of distortion can be used to measure the difference between areas and volumes in a subgroup and in a group. In this talk, we give new bounds on the higher-order distortion of horospheres in a symmetric space, inspired by ideas from combinatorial Morse theory. These bounds imply that a $Q$–rank 1 lattice in a symmetric space of rank $k$ has Euclidean filling volume functions up to dimension $k – 1$ and resolve a conjecture of Bux and Wortman for such lattices. (Received September 18, 2015)