We prove that if a closed smooth simply-connected 4-manifold with a circle action admits an almost non-negatively curved sequence of invariant Riemannian metrics, then it also admits a non-negatively curved Riemannian metric invariant with respect to the same action. This gives a classification of closed smooth simply-connected 4-manifolds of almost non-negative curvature under the assumption of continuous symmetry. (Received August 18, 2019)