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Gunhee Cho* (gunhee.cho@math.ucsb.edu), 552 University Rd, Isla Vista, CA 93117, Isla Vista, CA 93117. *The lower bound of the integrated Carathéodory-Reiffen metric and Invariant metrics on complete noncompact Kähler manifolds.*

We seek to gain progress on the following long-standing conjectures in hyperbolic complex geometry: prove that a simply connected complete Kähler manifold with negatively pinched sectional curvature is biholomorphic to a bounded domain and the Carathéodory-Reiffen metric does not vanish everywhere. As the next development of the important recent results of D. Wu and S.T. Yau in obtaining uniform equivalence of the base Kähler metric with the Bergman metric, the Kobayashi-Royden metric, and the complete Kähler-Einstein metric in the conjecture class but missing of the Carathéodory-Reiffen metric, we provide an integrated gradient estimate of the bounded holomorphic function which becomes a quantitative lower bound of the integrated Carathéodory-Reiffen metric. Also, without requiring the negatively pinched holomorphic sectional curvature condition of the Bergman metric, we establish the equivalence of the Bergman metric, the Kobayashi-Royden metric, and the complete Kähler-Einstein metric of negative scalar curvature under a bounded curvature condition of the Bergman metric on an n -dimensional complete noncompact Kähler manifold with some reasonable conditions which also imply non-vanishing Carathéodory-Reiffen metric. This is a joint work with Kyu-Hwan Lee. (Received August 31, 2021)