A general version of the Hartogs extension theorem for separately holomorphic mappings between complex analytic spaces

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Abstract. Using recent development in Poletsky theory of discs, we prove the following result: Let X, Y be two complex manifolds, let Z be a complex analytic space which possesses the Hartogs extension property, let A (resp. B) be a non locally pluripolar subset of X (resp. Y). We show that every separately holomorphic mapping $f : W := (A \times Y) \cup (X \times B) \longrightarrow Z$ extends to a holomorphic mapping $\hat{f}$ on $\widehat{W} := \{(z, w) \in X \times Y : \widetilde{\omega}(z, A, X) + \widetilde{\omega}(w, B, Y) < 1\}$ such that $\hat{f} = f$ on $W \cap \widehat{W}$, where $\widetilde{\omega}(\cdot, A, X)$ (resp. $\widetilde{\omega}(\cdot, B, Y)$) is the plurisubharmonic measure of A (resp. B) relative to X (resp. Y). Generalizations of this result for an N-fold cross are also given.