Cones over metric measure spaces and the maximal diameter theorem

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Abstract. We present the following result.
The (K, N)-cone over some metric measure space satisfies the reduced Riemannian curvature-dimension condition $\mathrm{RCD}^*(KN, N+1)$ if and only if the underlying space satisfies $\mathrm{RCD}^*(N-1, N)$. The proof uses a characterization of reduced Riemannian curvature-dimension bounds by Bochners inequality that was established for metric measure spaces by Erbar, Kuwada and Sturm and independently by Ambrosio, Mondino and Savar. As corollary of our result and the Cheeger-Gigli-Gromoll splitting theorem we obtain a maximal diameter theorem for metric measure spaces that satisfy a reduced Riemannian curvature-dimension condition.