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CORRECTION

Correction to: Comparison Geometry for Integral Bakry–Émery Ricci Tensor Bounds

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Based on the recent joint work [1], we correct an error in Theorems 1.1 and 3.1 for the case $\frac{\pi}{2\sqrt{H}} < r < \frac{\pi}{\sqrt{H}}$, $H > 0$, and Theorem 1.6 of [2]. The detailed description and further development will appear in [1].

In Theorem 1.1, for the case $\frac{\pi}{2\sqrt{H}} < r < \frac{\pi}{\sqrt{H}}$, $H > 0$, we need to add an additional condition:

$$\partial_r f = -a \quad \text{or} \quad \partial_r f \geq -a - 2(n-1)\sqrt{H}\cot(\sqrt{H}r). \tag{1}$$

Because in the proof of this case (see page 837 in [2]), we overlooked the negative property of m_H from

$$\varphi' + \frac{1}{n-1}\left[(\varphi + a + \partial_r f)(\varphi + 2m_H + a + \partial_r f)\right] \leq \mathrm{Ric}^H_{f\,-}$$

to

$$\varphi' + \frac{\varphi^2}{n-1} + \frac{2m_H\varphi}{n-1} \leq \mathrm{Ric}^H_{f\,-}.$$

To correct this error, we add an additional condition (1) to ensure the above argument still holds.

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The correction impacts Theorem 3.1 for the case $\frac{\pi}{2\sqrt{H}} < r \le R < \frac{\pi}{\sqrt{H}}$, $H > 0$ in [2]. We should also add the additional condition (1) to ensure Theorem 3.1 remains true for this case.

The correction also impacts the assumption on f in Theorem 1.6 of [2]. The correct statement should be

Theorem 1 (Theorem 1.6 [2]). *Let $(M, g, e^{-f}dv)$ be an n-dimensional smooth metric measure space. Given $p > n/2$, $a \ge 0$, $H > 0$ and $R > 0$, there exist $D = D(n, H, a)$ and $\epsilon = \epsilon(n, p, a, H, R)$ such that if $\bar{k}(p, H, a, R) < \epsilon$ and*

$$\partial_r f = -a \quad \text{or} \quad \partial_r f \ge -a - 2(n-1)\sqrt{H}\cot(\pi - \bar{k}(p, H, a, R))$$

along all minimal geodesic segments from any $x \in M$, then $diam(M) \le D$.

We remark that the proofs of these results are the same as the previous arguments except using the present condition instead of the previous condition.

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References

1. Li, F.-J., Wu, J.-Y., Zheng, Y.: Myers' type theorem for integral Bakry-Émery Ricci tensor bounds, preprint
2. Wu, J.-Y.: Comparison geometry for integral Bakry-Émery Ricci tensor bounds. J. Geom. Anal. **29**, 828–867 (2019)