

Fukaya, Kenji

Collapsing Riemannian manifolds to ones with lower dimension. II. (English) Zbl 0703.53042
J. Math. Soc. Japan 41, No. 2, 333-356 (1989).

This paper is a continuation of the author's paper with the same title [Part I, *J. Differ. Geom.* 25, 139-156 (1987; [Zbl 0606.53027](#))]. We discuss the topological properties of Riemannian manifolds M the absolute value of their sectional curvature is smaller than 1 and which M are close to a Riemannian manifold X (of lower dimension) with respect to the Hausdorff distance [see *M. Gromov*, *Structure métrique pour les variétés riemanniennes*. Textes Mathématiques, 1. Paris: Cedic/Fernand Nathan (1981; [Zbl 0509.53034](#))]. In the former paper, it has been proved that M fibres over X with an infranilmanifold fibre, N/Γ .

In the present paper, employing *E. A. Ruh's* technique [*J. Differ. Geom.* 17, 1-14 (1982; [Zbl 0468.53036](#))] a smooth family of flat affine connections on the fibres is constructed. As a consequence, the structure group of the fibration is reduced to the semi-direct product $CN/CN \cap \Gamma \rtimes \text{Aut } \Gamma$, where CN is the center of the nilpotent group N . It turns out that this condition on the structure group is sufficient to construct a family of metrics on M converging to X . An application to a gap phenomenon of minimal volume (diameter bound) of aspherical manifolds is given.

Reviewer: [Kenji Fukaya](#)

MSC:

[53C23](#) Global geometric and topological methods (à la Gromov); differential geometric analysis on metric spaces

Cited in **3** Reviews
Cited in **23** Documents

Keywords:

[sectional curvature](#); [Hausdorff distance](#); [infranilmanifold fibre](#); [flat affine connections](#); [minimal volume](#)

Full Text: [DOI](#)