

Table S1. The detail of imagery from Google Earth used for manually mapping ‘real’ river networks.

Study area	Company	Satellite*	Spatial resolution*	Date	Scenes
Dongliao Basin	Digital Globe	Quickbird	0.65 m	17/10/2006	1
	Digital Globe	Quickbird	0.65 m	23/05/2008	3
	Digital Globe	Quickbird	0.65 m	27/10/2008	5
	Digital Globe	Quickbird	0.65 m	06/08/2009	1
	Digital Globe	Quickbird	0.65 m	17/11/2009	8
	Digital Globe	Quickbird	0.65 m	23/12/2009	7
	Digital Globe	Quickbird	0.65 m	31/12/2009	3
	Digital Globe	Quickbird	0.65 m	01/04/2010	1
	Digital Globe	Quickbird	0.65 m	08/11/2012	1
	CNES / Airbus	Spot	1.5 m	01/04/2014	1
	CNES / Airbus	Spot	1.5 m	13/02/2014	1
	CNES / Airbus	Spot	1.5 m	20/02/2014	1
East Tiaoxi Basin	Digital Globe	Quickbird	0.65 m	28/12/2003	1
	Digital Globe	Quickbird	0.65 m	07/01/2006	5
	Digital Globe	Quickbird	0.65 m	03/05/2006	1
	Digital Globe	Quickbird	0.65 m	18/12/2006	1
	Digital Globe	Quickbird	0.65 m	20/12/2006	1
	Digital Globe	Quickbird	0.65 m	05/06/2008	4
	Digital Globe	Quickbird	0.65 m	25/02/2009	2
	Digital Globe	Quickbird	0.65 m	11/09/2009	2
Hanbei Basin	Digital Globe	Spot	0.65 m	22/12/2006	1
	Digital Globe	Spot	0.65 m	27/01/2003	1
	CNES / Airbus	Spot	1.5 m	12/08/2013	1
	CNES / Airbus	Spot	1.5 m	29/03/2014	1

*Google Earth provides the information about which organisation supplies the data and when the data is acquired but not the satellite type and the spatial resolution of the imagery. Herein we visually estimate the data resolution by rule of thumb and decide the most possible satellite type and its spatial resolution according to the data supplying organisation’s satellite catalogue.



Fig. S1. Examples of extracted river courses from the Google Earth platform.

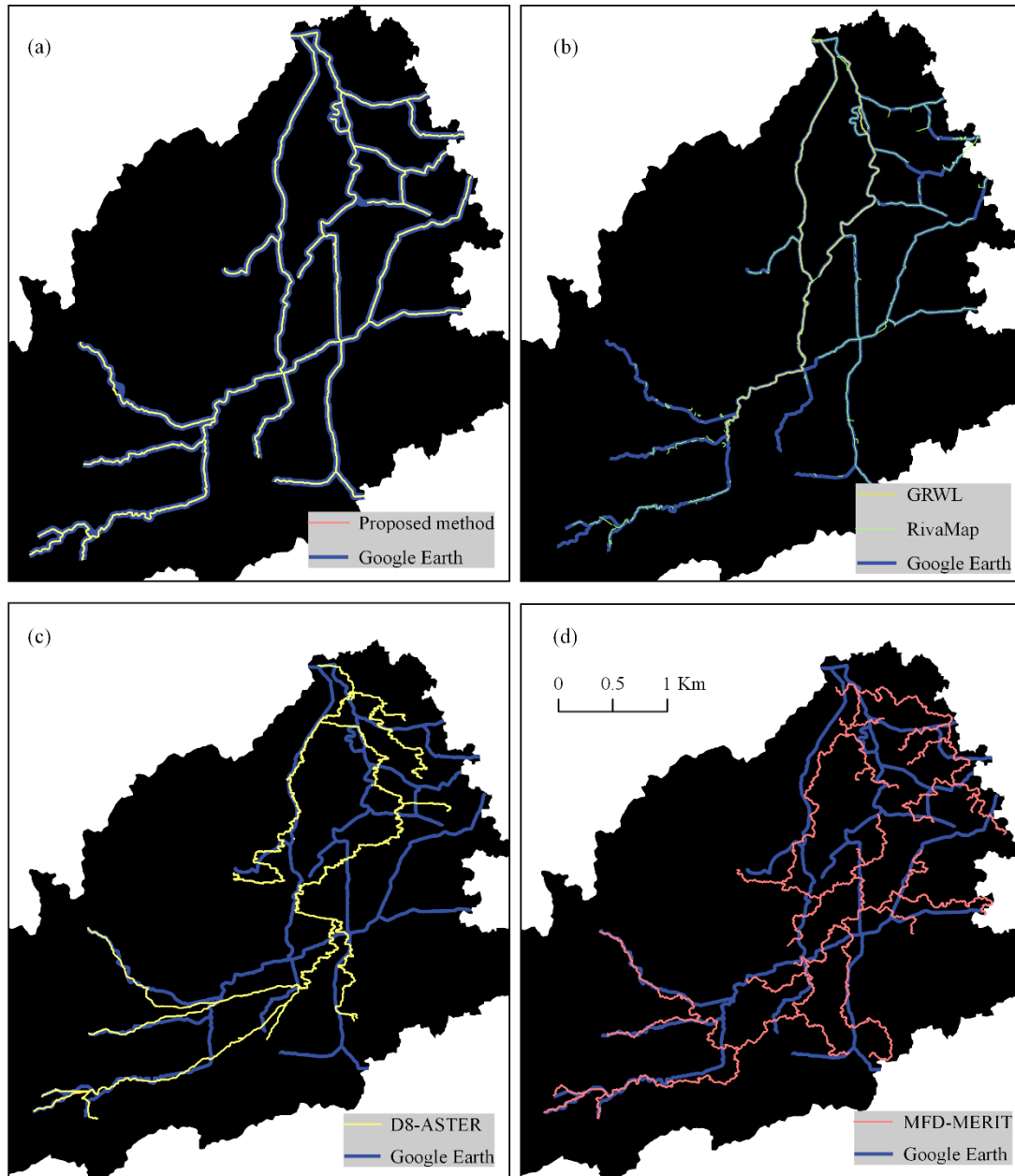


Fig. S2. Comparison between the river networks derived using different methods and the reference river network mapped from Google Earth in the East Tiaoxi Basin.

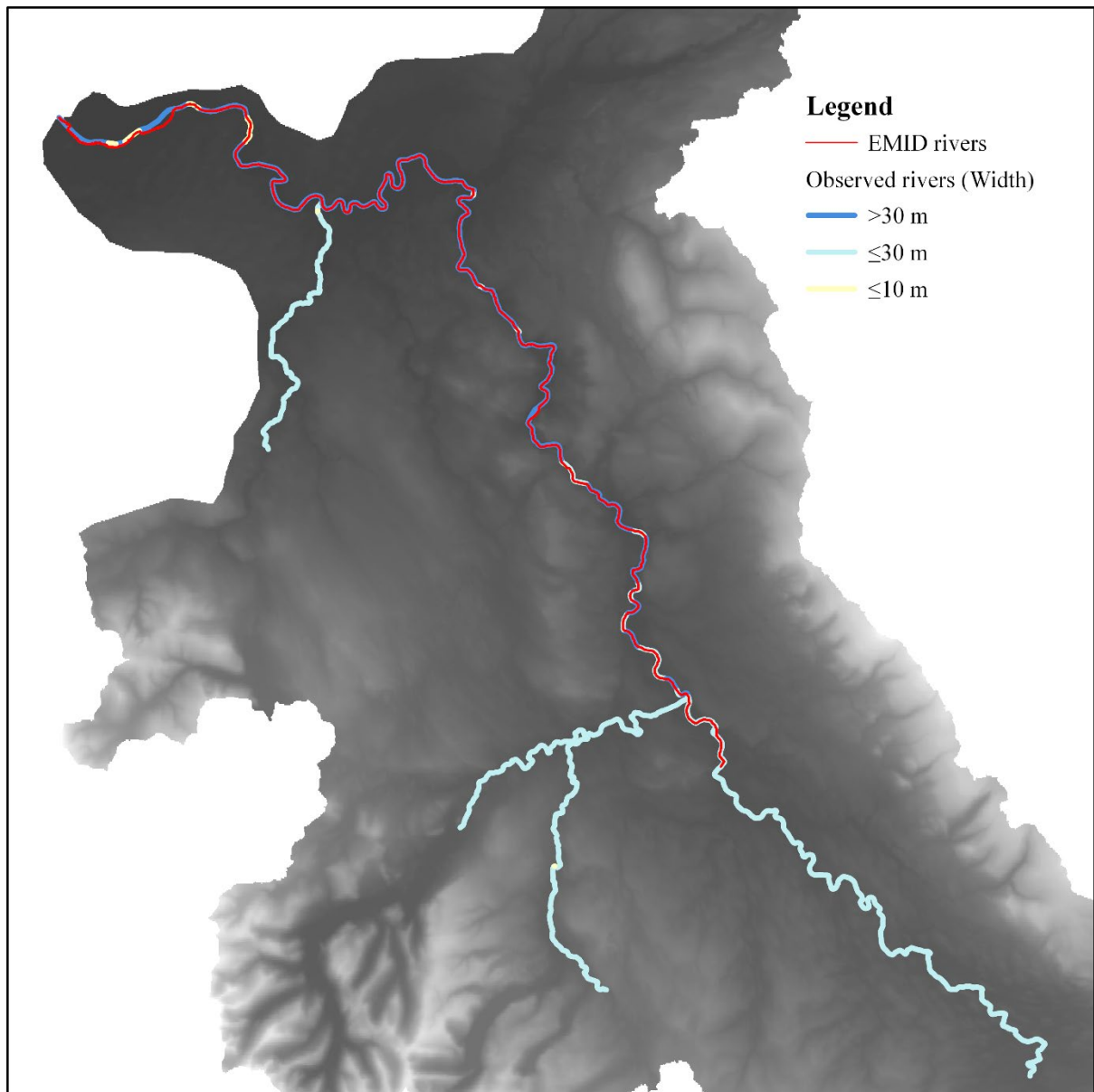


Fig. S3. Comparison between the river networks derived from the Landsat imagery using the proposed EMID method and the field surveyed rivers for the Eden Catchment.

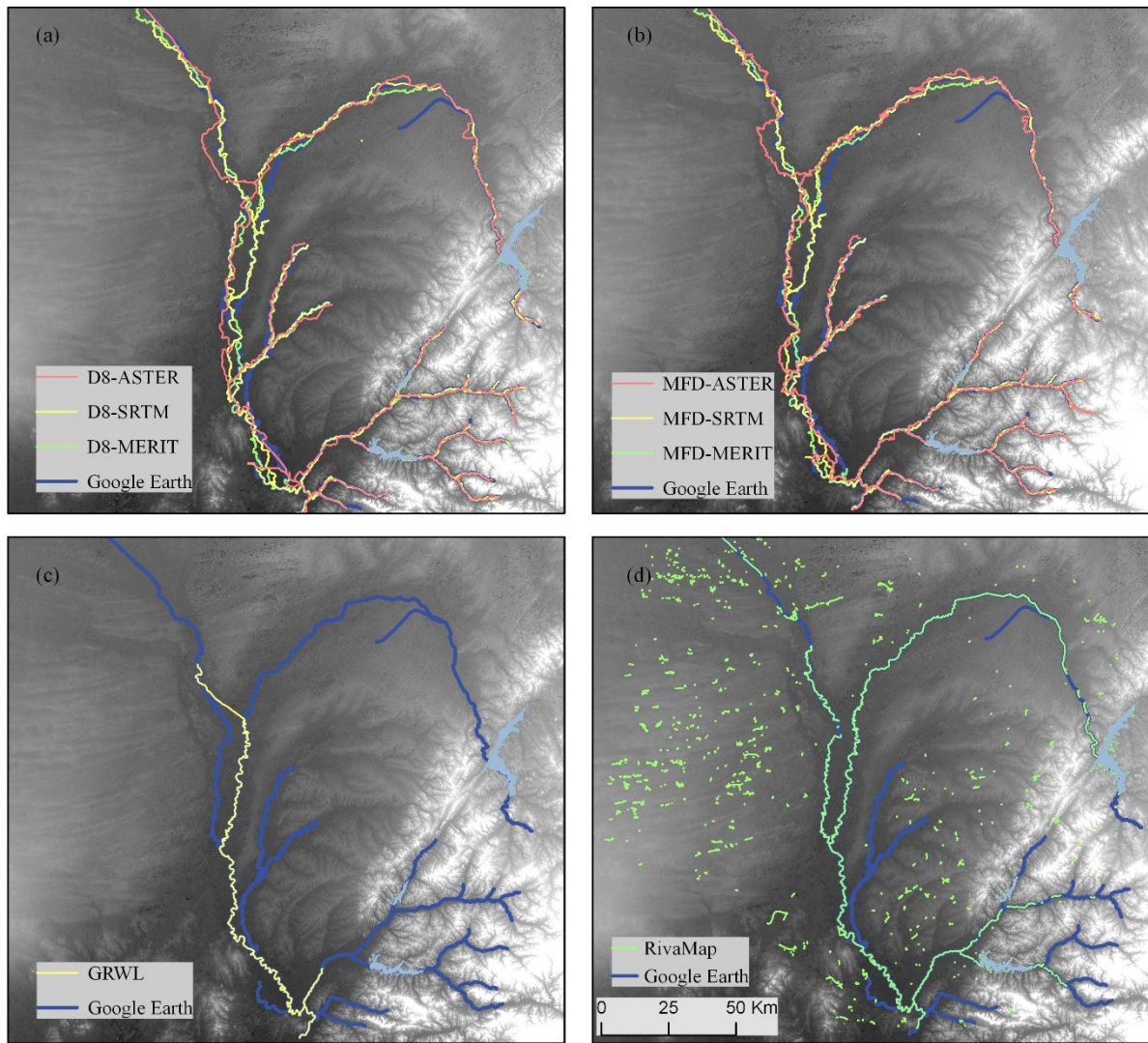


Fig. S4. Comparison between the river networks derived using different approaches and the high-precision river network mapped from Google Earth in the Dongliao River Basin.

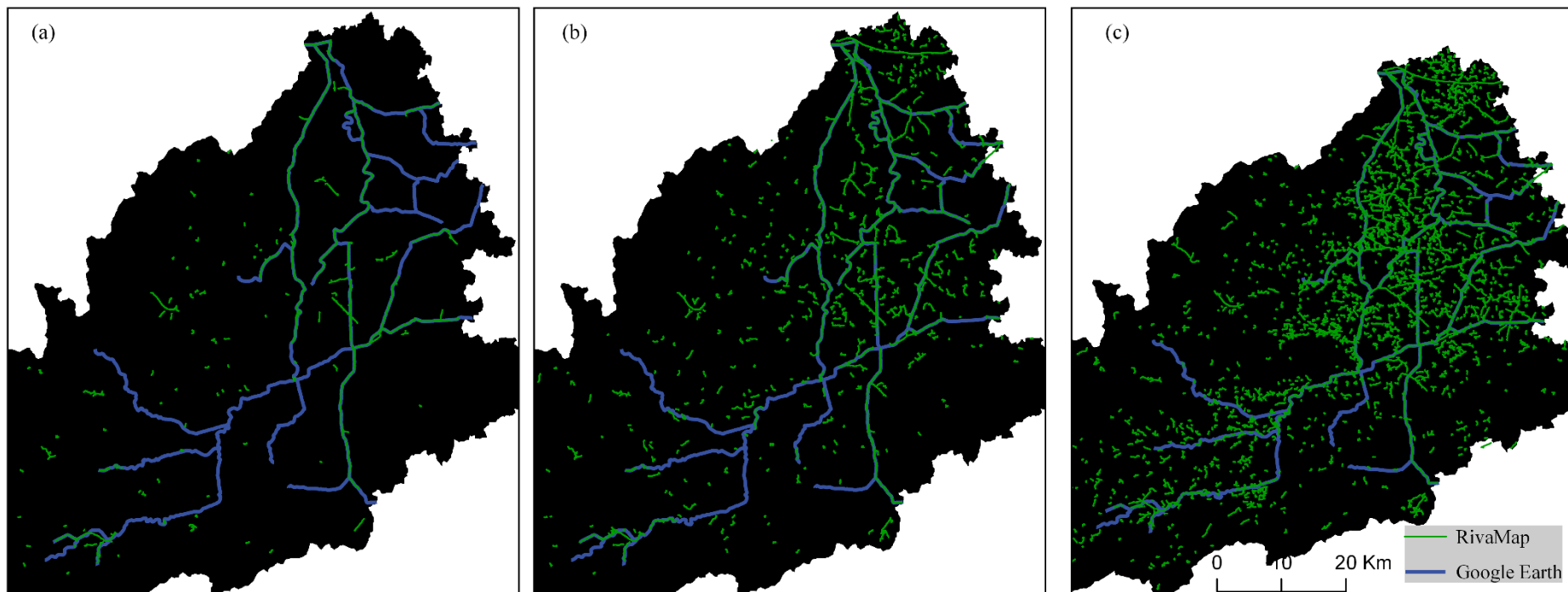


Fig. S5. Comparison between the river networks derived from RivaMap based on imagery under different hydrological conditions and the high-precision river network mapped from Google Earth in the East Tiaoxi Basins: (a) dry season; (b) normal season; (c) wet season.