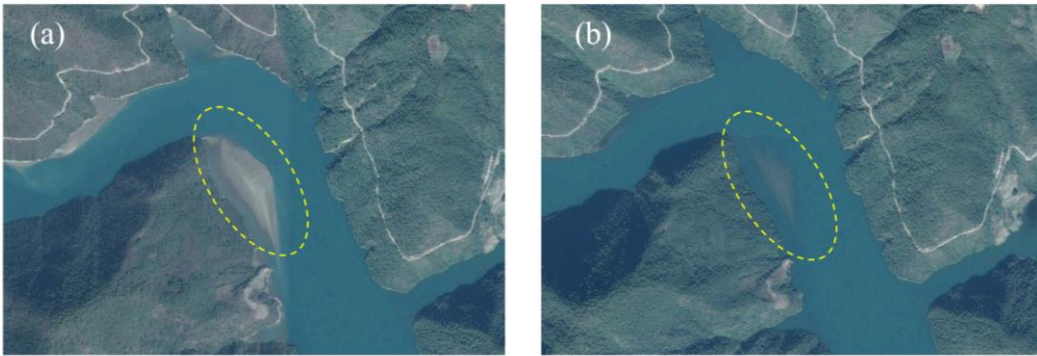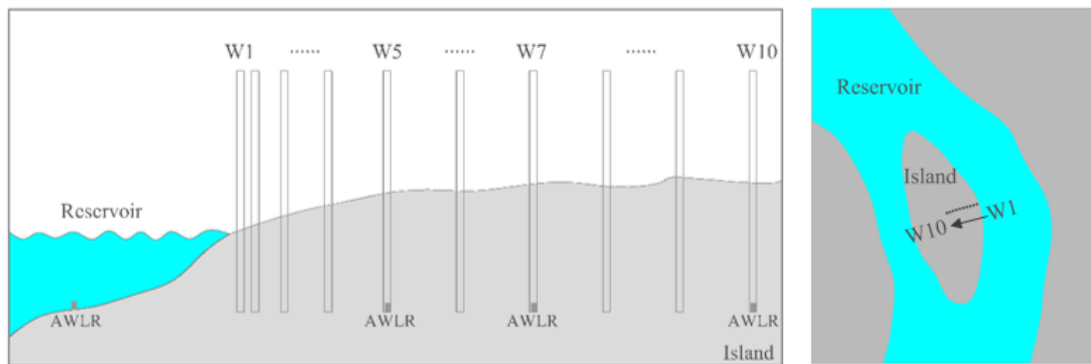**Fig. S1** The river impoundment formed islands in the Lancang-Mekong River. There were about 50 sediment-deposited islands, of which 54.2%, 12.5% and 33.3% were located at the convex bank (a), the concave bank (b), and the channel (c), respectively.
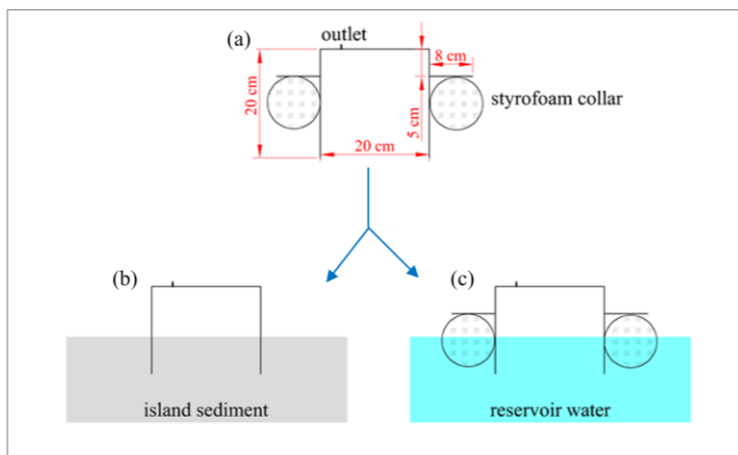
Fig. S2 Island image before (a) and after (b) flooding under reservoir operation.

Fig. S3 Monitoring wells established from the island edge to the center.
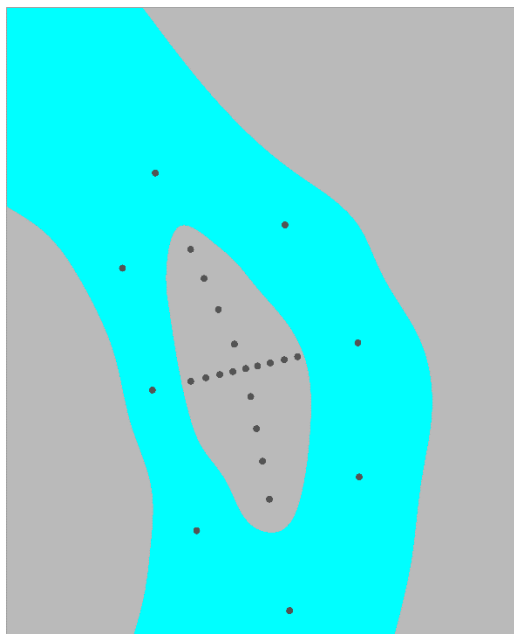
Fig. S4 Sampling sites for methane flux analyses in the island and reservoir. Solid black

circles represent sampling sites.

Fig. S5 Bifunctional static chambers (a) for methane flux analyses across the sediment-air interface in the island (b) and water-air interface in the reservoir (c). Styrofoam collar was removable.
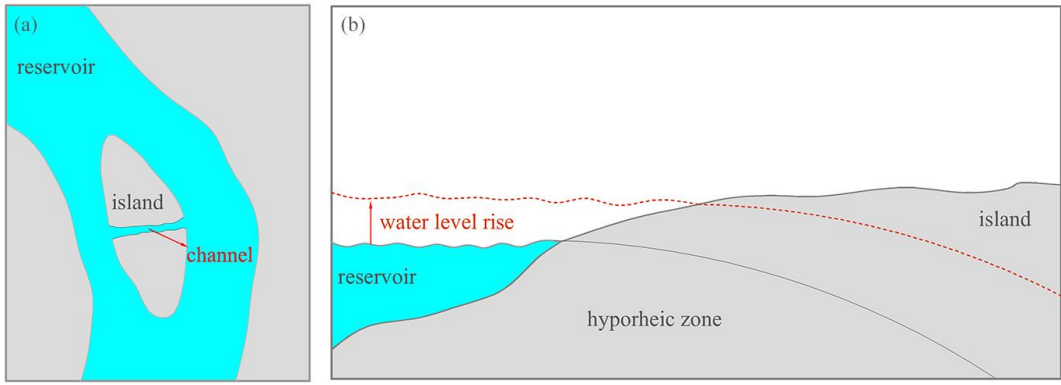
Fig. S6 Strategy for the removal of a methane emission hotspot at the island center. (a) Artificial channel; (b) Rising water level in the reservoir.

Table S1 The main features of cascade reservoirs in the Lancang-Mekong River, China

	Miaowei	Gongguoqiao	Xiaowan	Manwan	Dachaoshan	Nuozhadu	Jinghong
Dam height (m)	139.8	105	292	132	115	261.5	108
Water level (m)	1408	1307	1240	994	899	812	602
Storage capacity (10^8 m^3)	6.6	3.5	149.1	5.0	9.4	237.0	11.4
Installed capacity (10^6 kW)	1.4	0.90	4.20	1.50	1.35	5.85	1.75
Hydrological residence time (a)	–	0.01	2.36	0.78	0.30	1.87	0.40

"–" means the unknown data