Supporting Information

Reduction in Arsenic Exposure by Domestic Water Purification Devices in Shanghai Area and Related Health Risk Assessment

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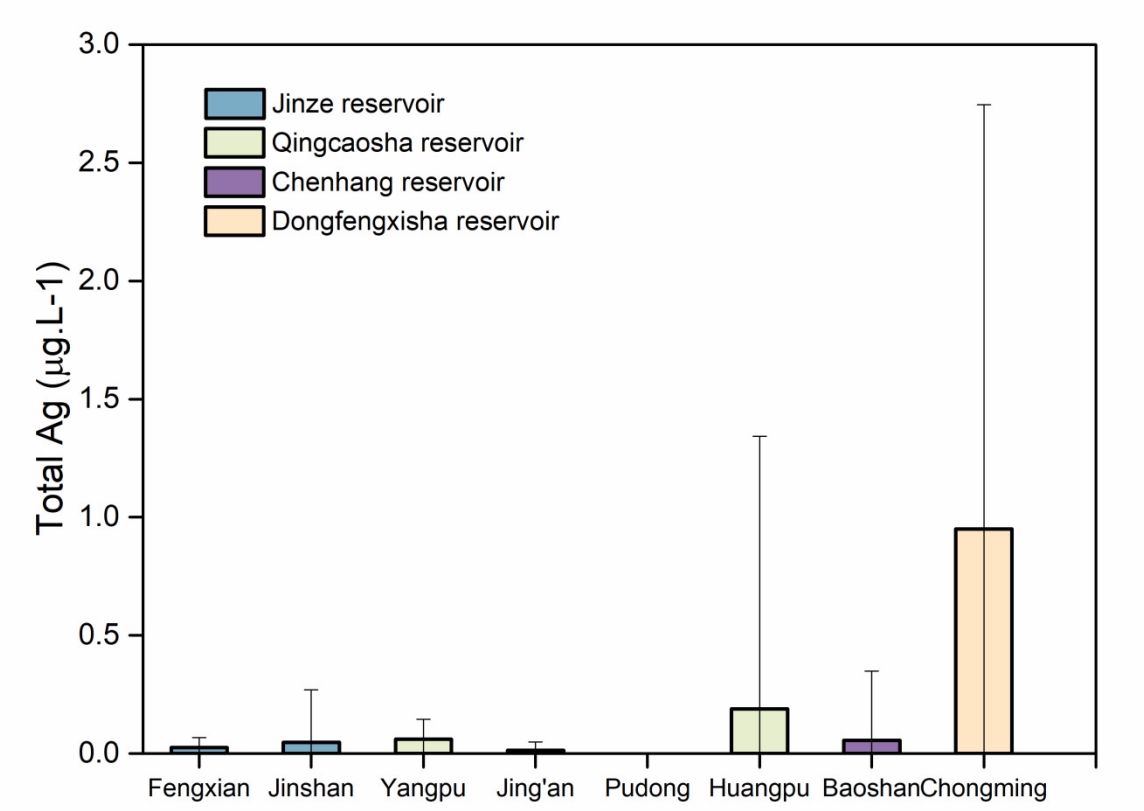

Figure S1. Distribution of total Ag in the end water of Shanghai pipeline network.

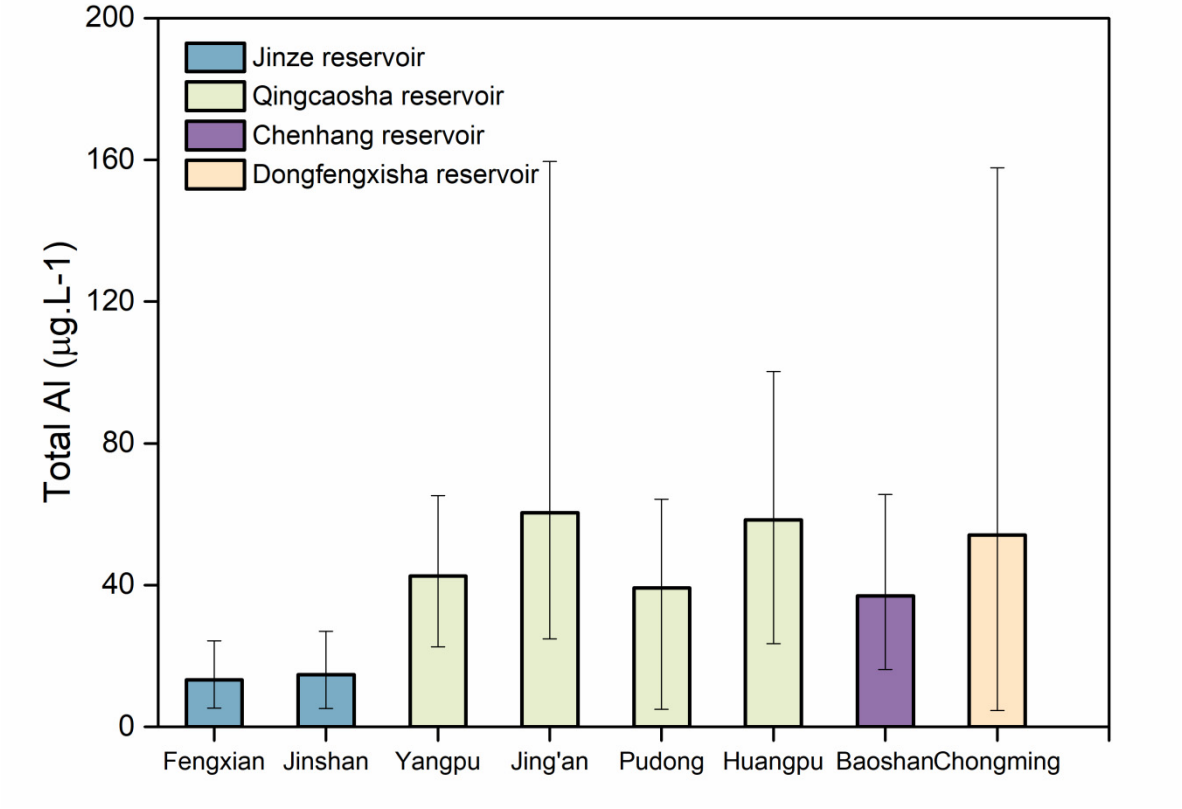

Figure S2. Distribution of total Al in the end water of Shanghai pipeline network.

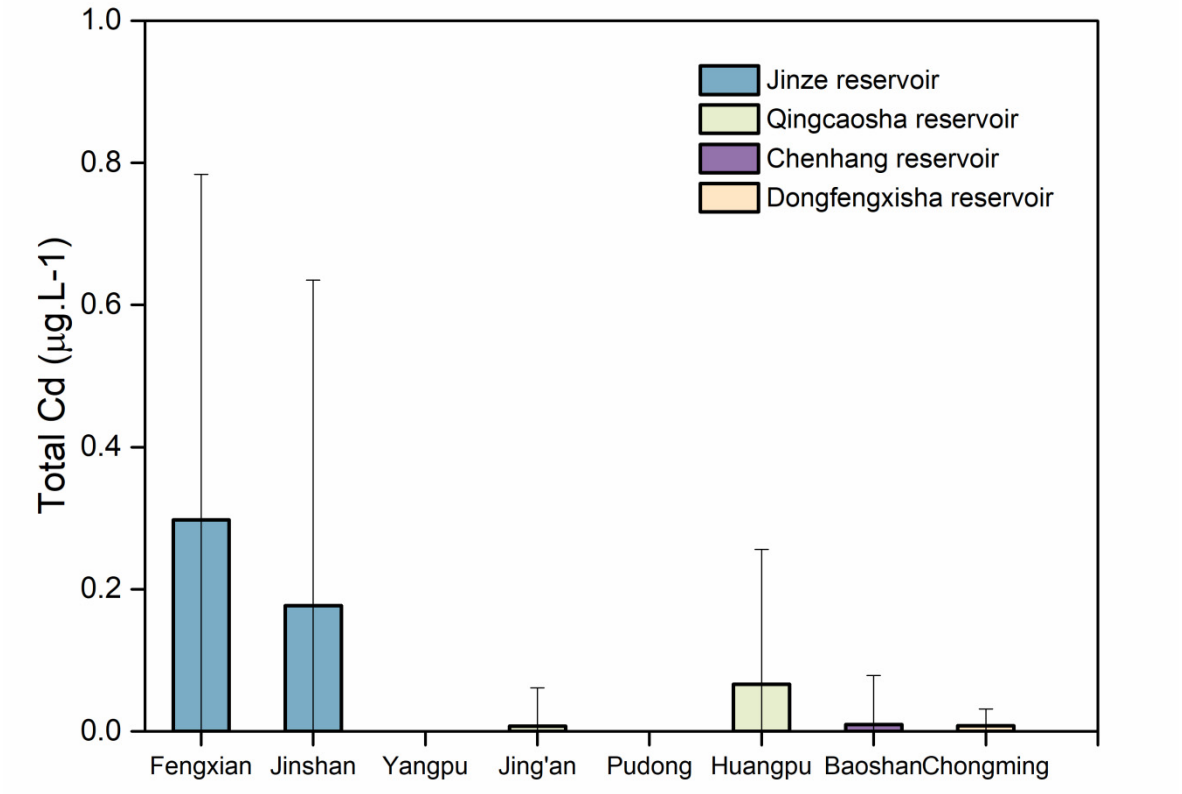

Figure S3. Distribution of total Cd in the end water of Shanghai pipeline network.

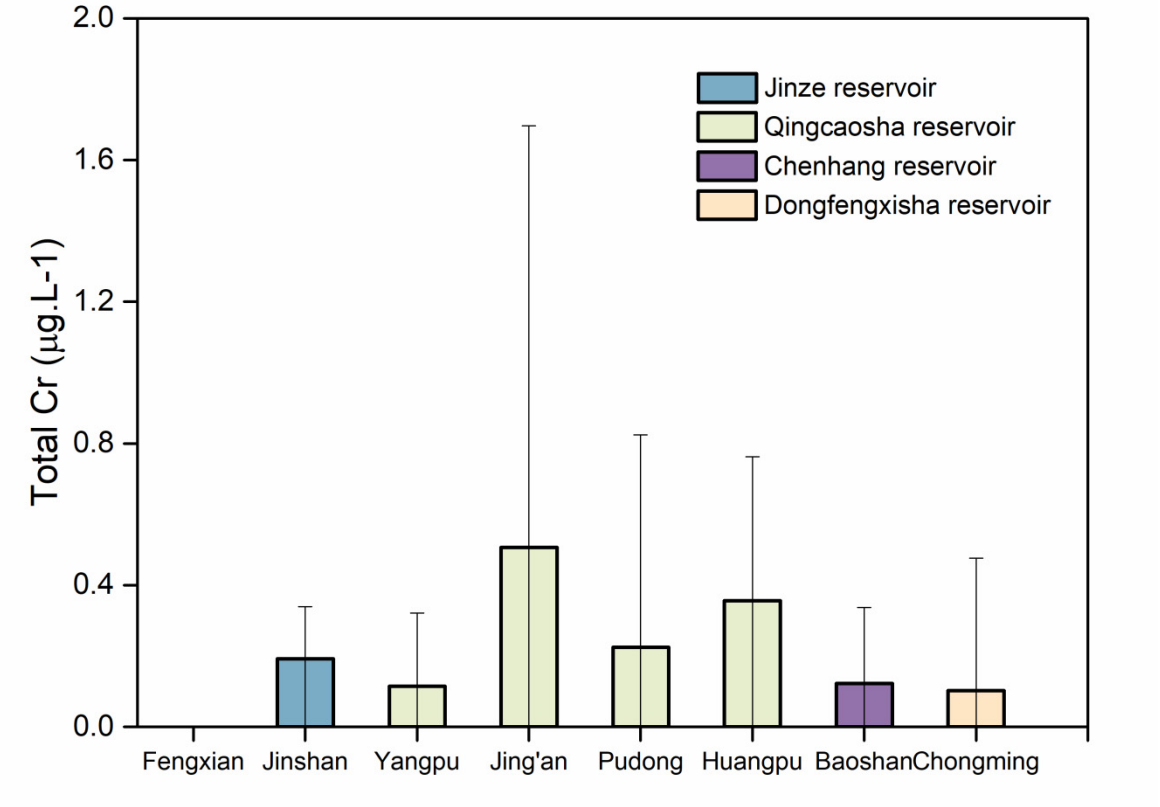

Figure S4. Distribution of total Cr in the end water of Shanghai pipeline network.

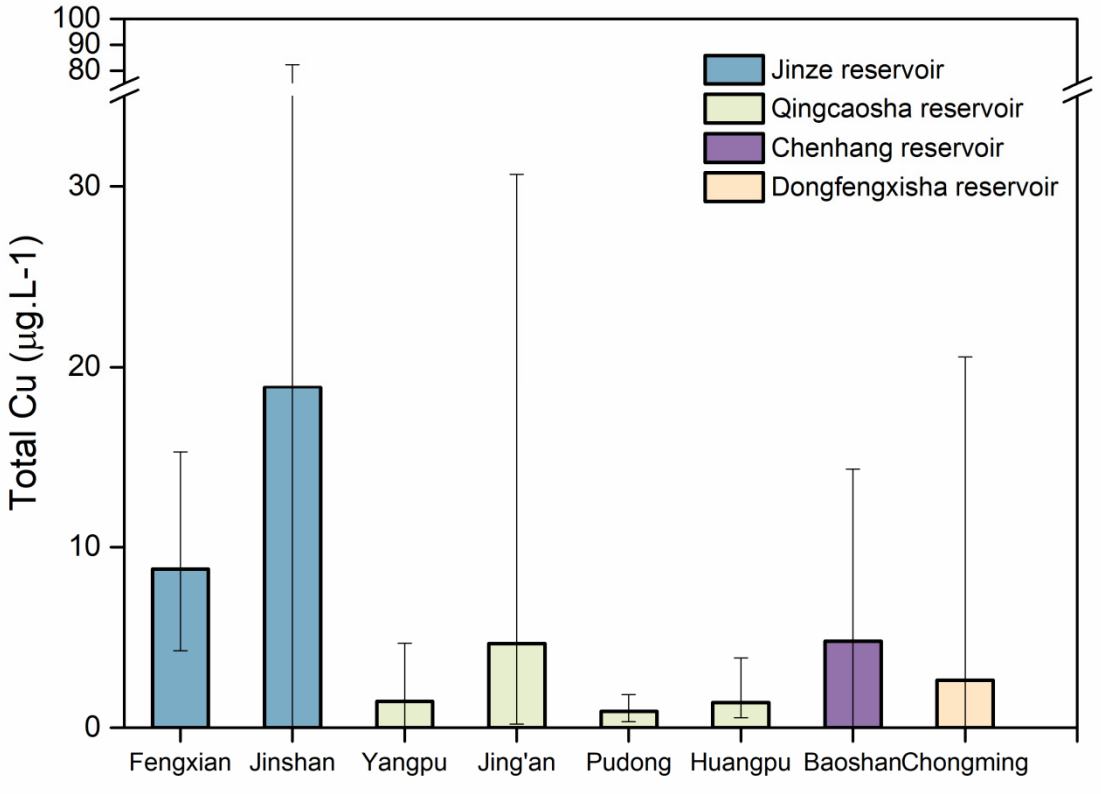

Figure S5. Distribution of total Cu in the end water of Shanghai pipeline network.

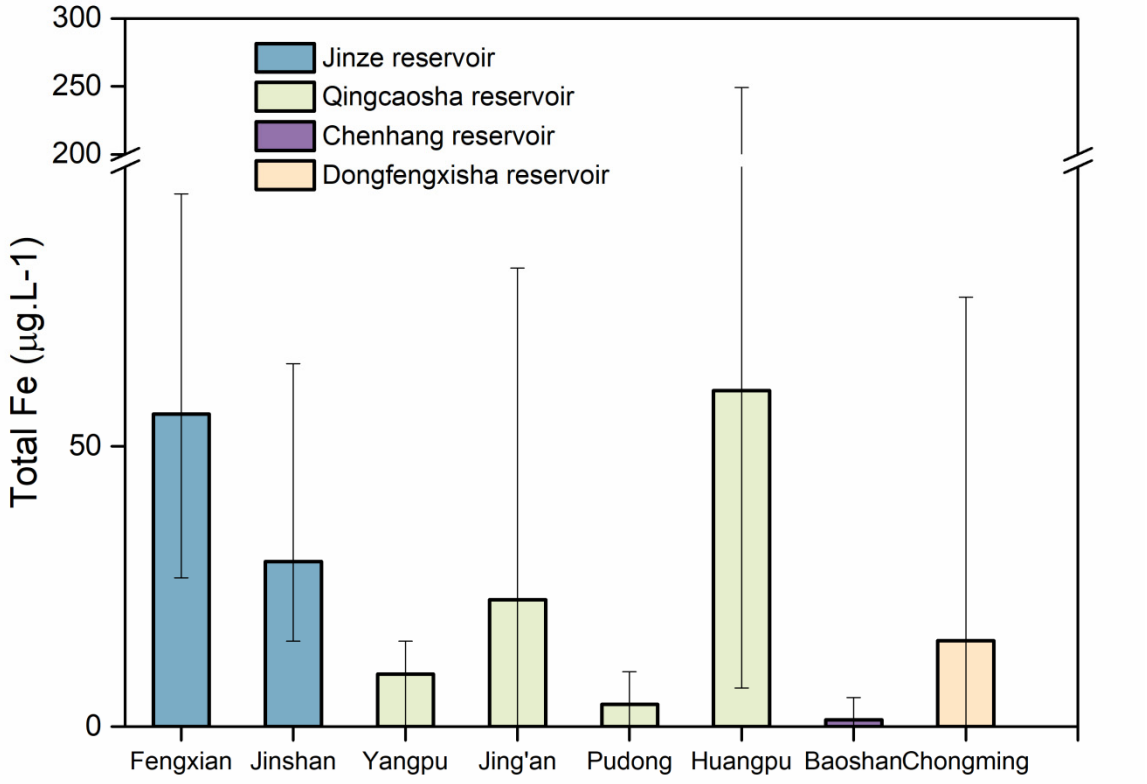

Figure S6. Distribution of total Fein the end water of Shanghai pipeline network.

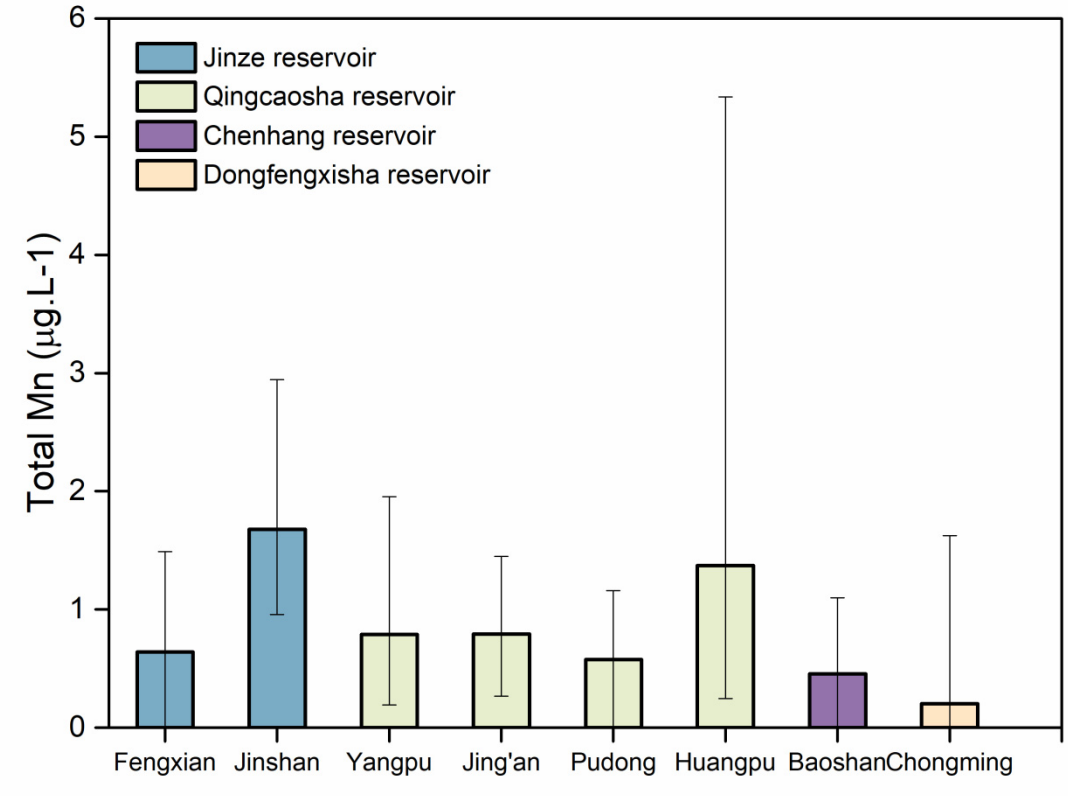

Figure S7. Distribution of total Mn in the end water of Shanghai pipeline network.

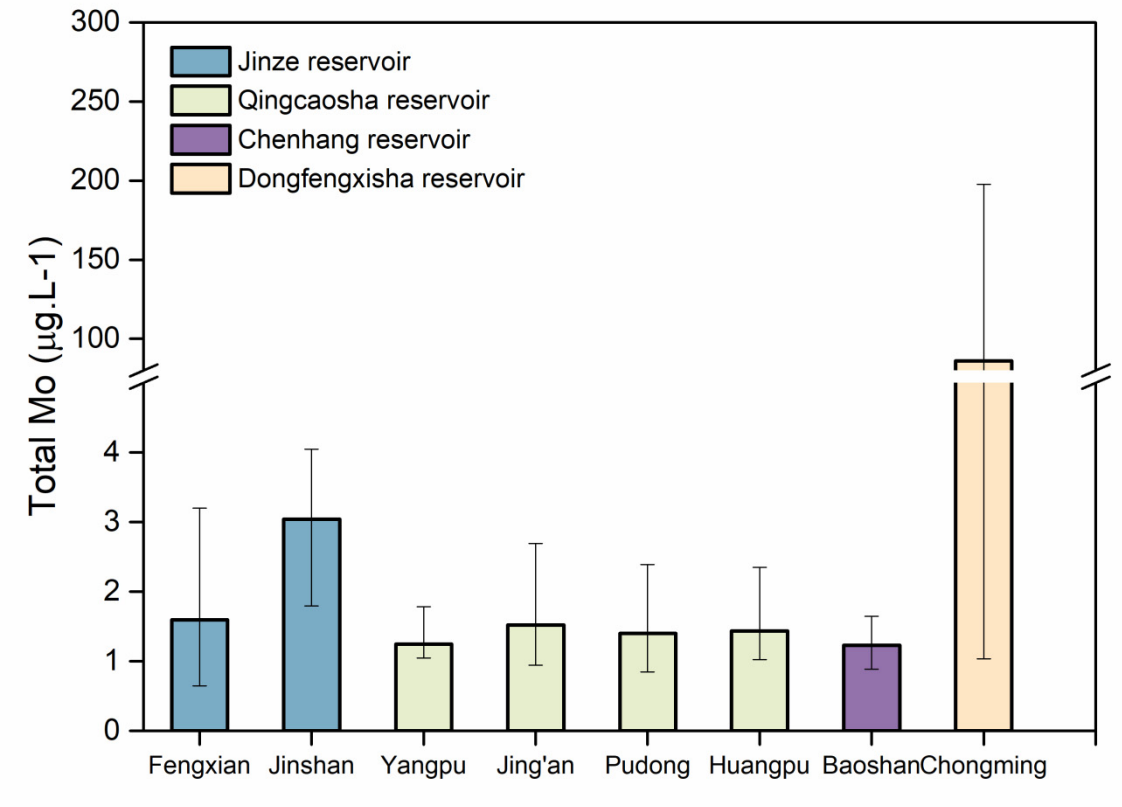

Figure S8. Distribution of total Mo in the end water of Shanghai pipeline network.

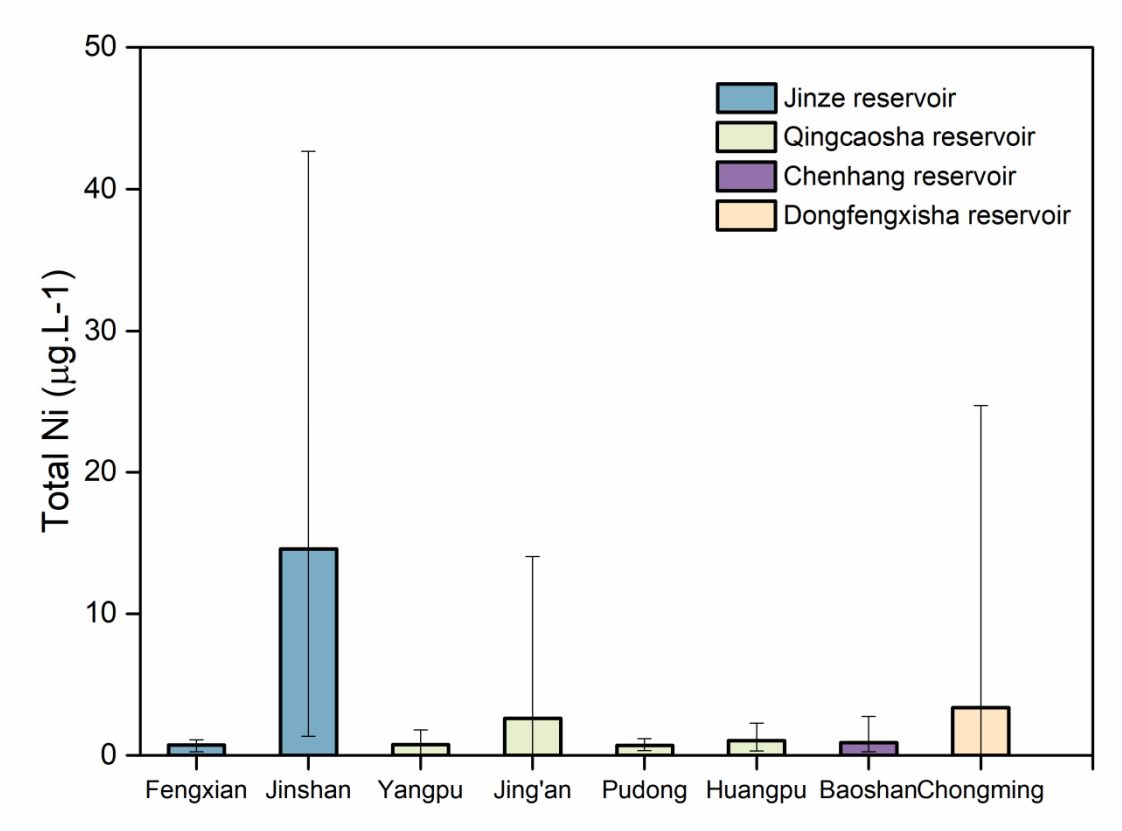

Figure S9. Distribution of total Ni in the end water of Shanghai pipeline network.

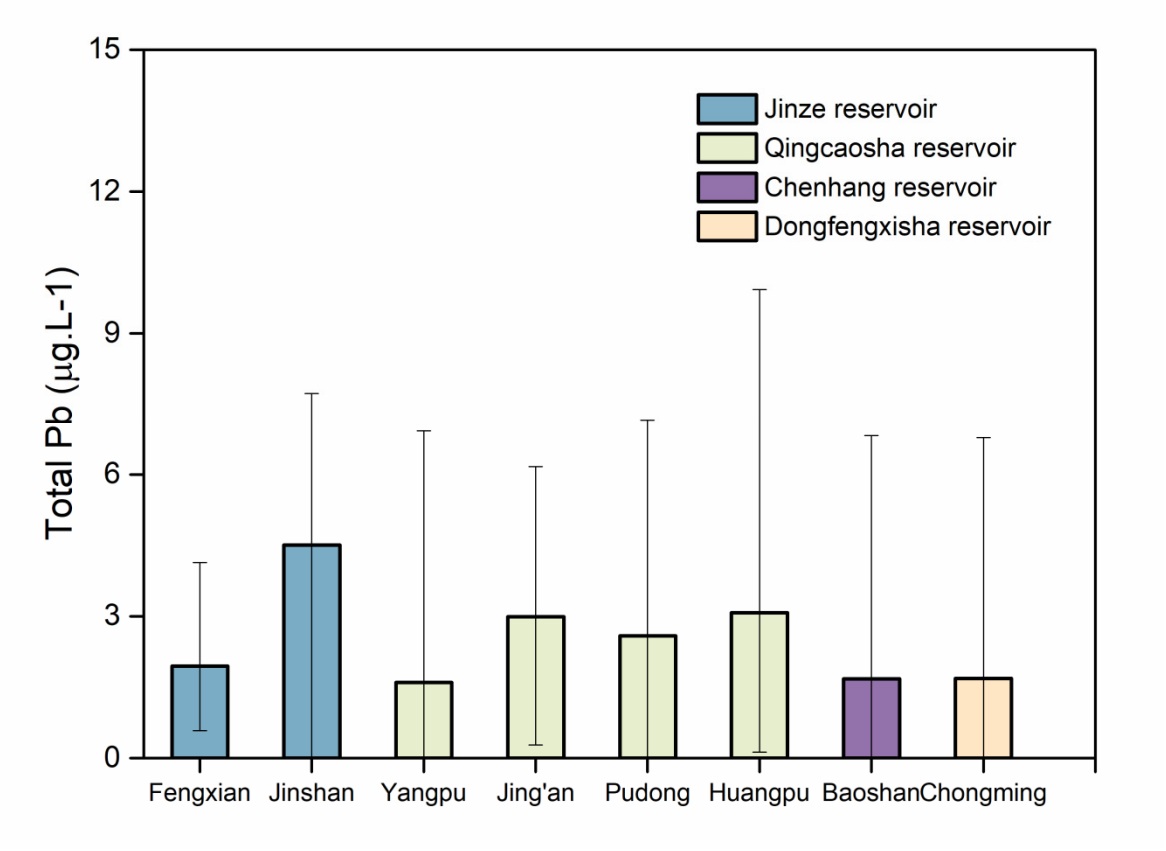

Figure S10. Distribution of total Pb in the end water of Shanghai pipeline network.

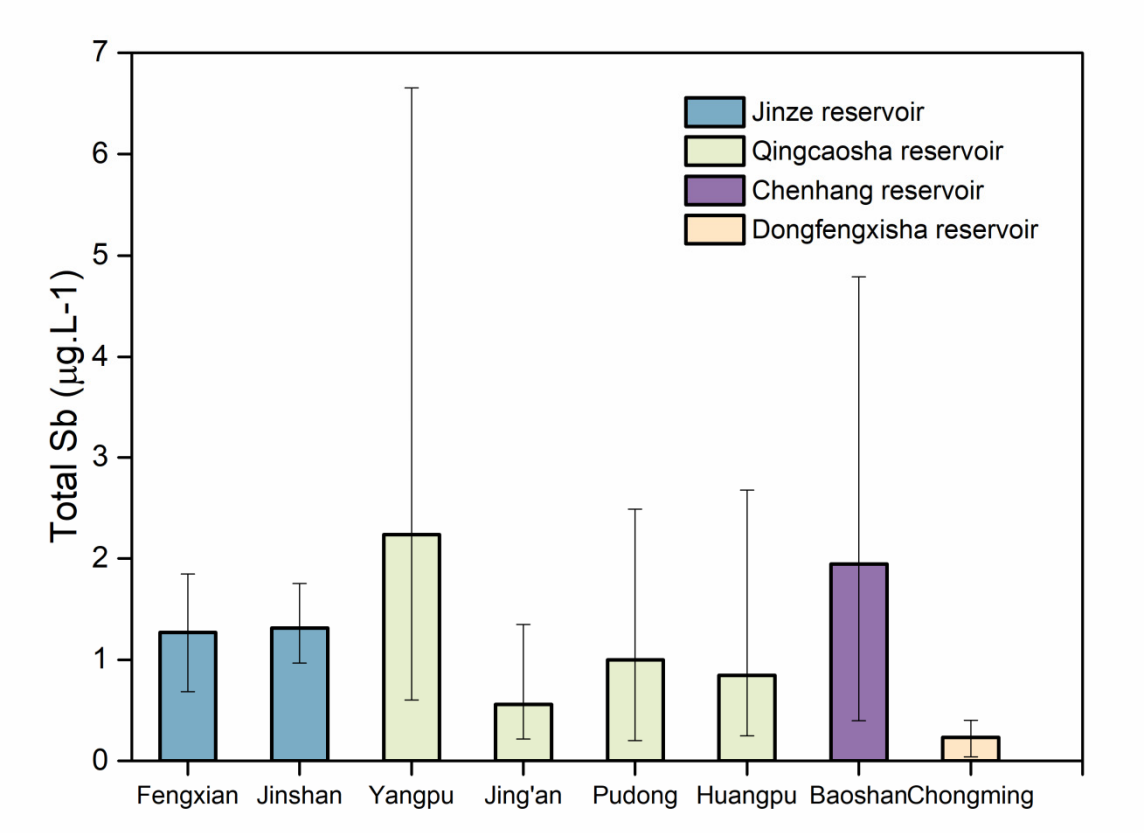

Figure S11. Distribution of total Sb in the end water of Shanghai pipeline network.

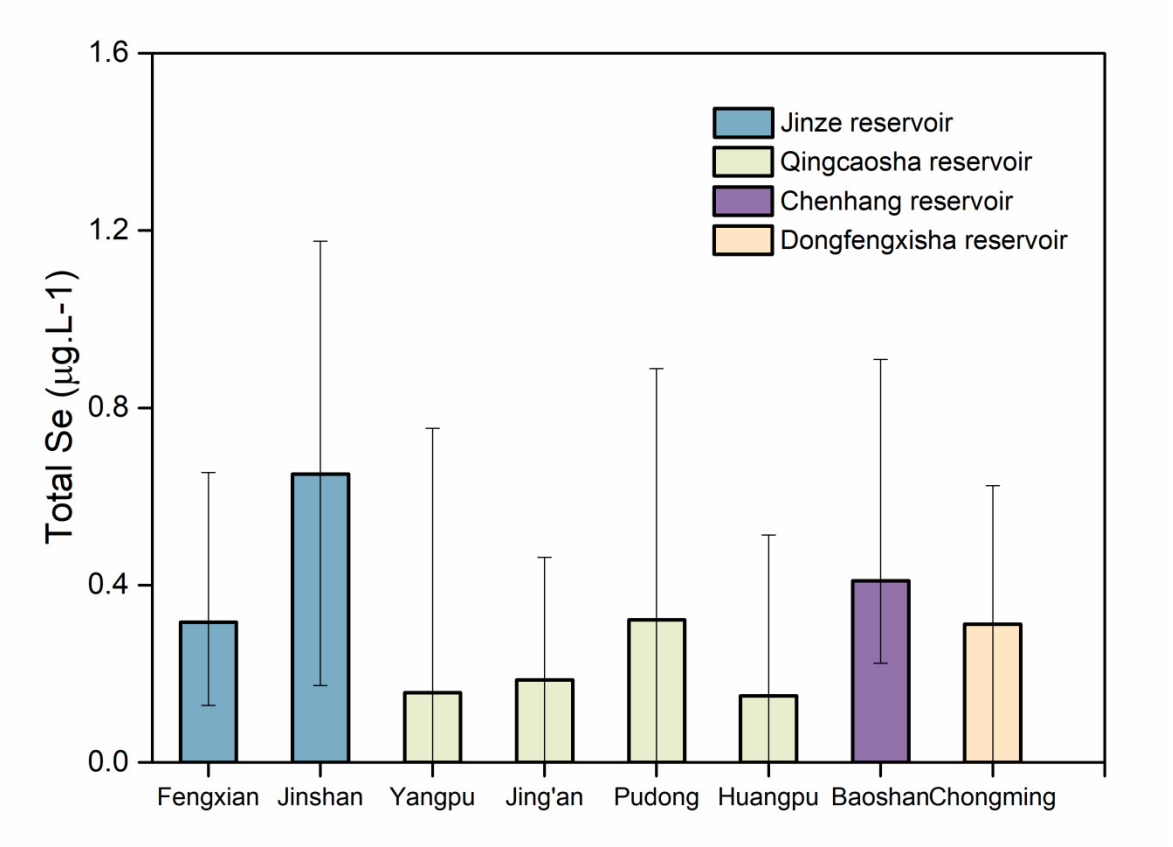

Figure S12. Distribution of total Se in the end water of Shanghai pipeline network.

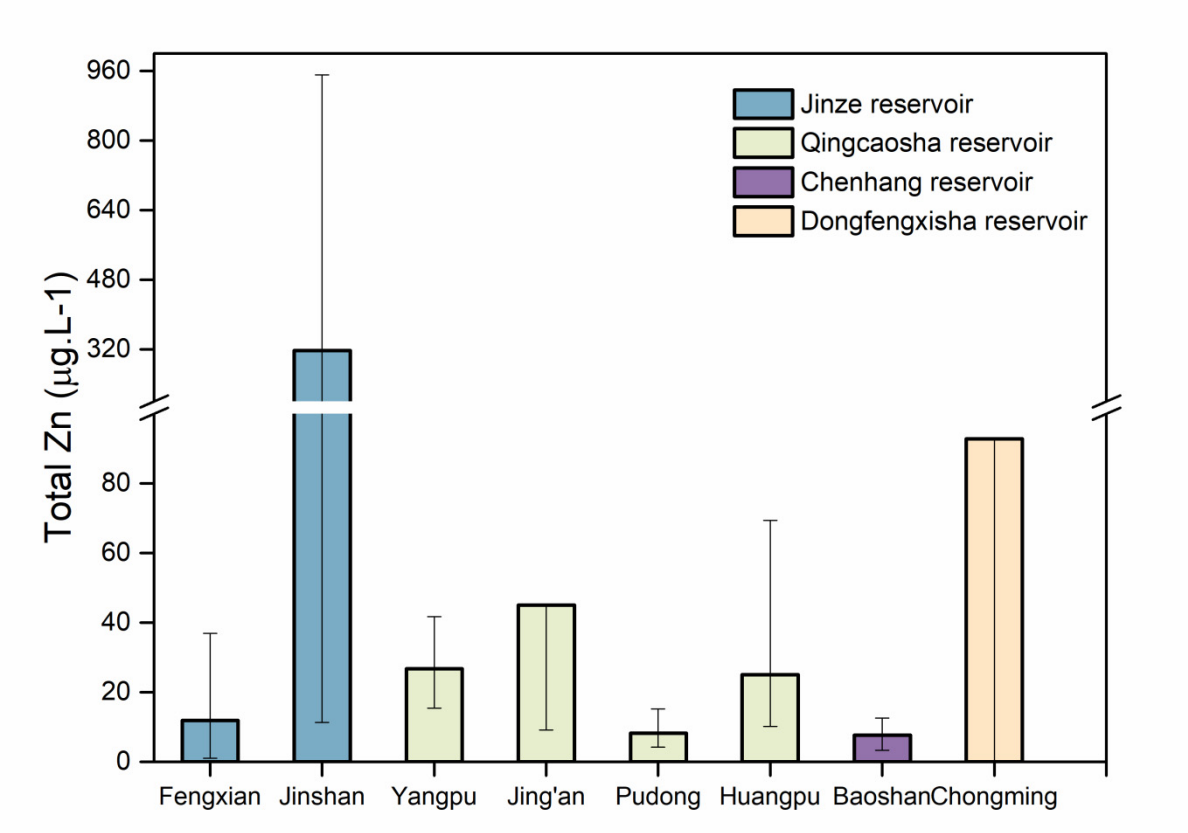

Figure S13. Distribution of total Zn in the end water of Shanghai pipeline network.

Table S1 General filter elements and related technical parameters of water purifiers in market.

Filter element of water purifier	Brief description	Modes	Technical data	Standards
Polypropylene	Made from non-toxic polypropylene	Coarse filtering	Filtration accuracy 5μm.	GB/T 30306 GB/T 17219
Activated carbon	Granular activated carbon and sintered activated carbon	Adsorption and filtration	Iodine adsorption value, methylene blue adsorption value, intensity and other indicators	GB/T 13803.2 GB/T 7701.2 GB/T 30306 GB/T 17219
Hollow fibre ultrafiltration	Filtration accuracy 0.1–0.01μm.	Filtration	pH value, working pressure, working temperature, retention rate	HY/T 062 HY/T 112
Nanofiltration	Filtration accuracy 1nm	Filtration	Monovalent ion removal rate, divalent ion removal rate, water recovery rate	HY/T 113 HY/T 114
Reverse osmosis	Rolled polyamide composite reverse osmosis membranes，Filtration accuracy 0.1nm	Filtration	Desalination rate	GB/T 34241
Post-activated carbon（T33）	Granular activated carbon	Adsorption and filtration	Iodine adsorption value, methylene blue adsorption value, intensity and other indicators	GB/T 13803.2 GB/T 7701.2 GB/T 30306 GB/T 17219

Table S2 The technical parameters of the three water purifiers.

Three types of water purifies	Tilter elements at all levels	Technical parameters
Ultrafiltration water purifier from manufacturer C Stages=4 Pressure inlet= 0.1–0.4Mpa Temperature=4–38℃ Influent quality=top water (GB5749) Purified water flow=0.12 m^3 h^{-1} Total purified water=2 m^3	Polypropylene cotton filter Granular activated carbon	Length=254 mm Filtering accuracy=10 μm pH scope=1–13 Pressure inlet= 0.1–0.4 Mpa Pressure drop ≤ 0.2 Mpa Nutshell Activated Carbon Length=254 mm Filtering accuracy=5 μm Pressure inlet ≤ 1Mpa Iodine adsorption value=800–1000mg/g

	Ultrafiltration membrane	Hollow fiber PAN Filtering accuracy=0.01 μm Pressure inlet= 0.1–1.6 Mpa Pressure drop ≤ 0.016 Mpa Effective membrane area=16 m^3
	Post activated carbon	Coconut shell activated carbon Filtering accuracy=5 μm Pressure inlet ≤ 0.4 Mpa Iodine adsorption value ≥ 950 mg/g
Nanofiltration water purifier from manufacturer B Stages=4 Pressure inlet= 0.1–0.5Mpa Temperature=4–38℃ Influent quality=top water (GB5749) Purified water flow=0.09 m^3 h^{-1} Total purified water=4 m^3	Polypropylene cotton filter	Length=254 mm Filtering accuracy=10μm pH scope=1–13 Pressure inlet= 0.1–0.4 Mpa Pressure drop ≤ 0.2 Mpa
	Sintered activated carbon	Nutshell Activated Carbon Length=254 mm Filtering accuracy=0.5 μm Pressure inlet ≤ 1 Mpa Iodine adsorption value ≥ 1200 mg/g
	Nanofiltration membrane	SNF Filtering accuracy=1 nm Pressure inlet= 0.5–2.0 Mpa
	Post activated carbon	Coconut shell activated carbon Length=254 mm Filtering accuracy=5 μm Pressure inlet ≤ 0.4 Mpa Iodine adsorption value ≥ 1000 mg/g
Reverse osmosis water purifier from manufacturer A Stages=4 Pressure inlet= 0.1–0.4Mpa Temperature=4–38℃ Influent quality=top water (GB5749) Purified water flow=0.063 m^3 h^{-1} Total purified water=5 m^3	Polypropylene cotton filter	Length=254 mm Filtering accuracy=10 μm pH scope=1–13 Pressure inlet= 0.1-0.4 Mpa Pressure drop ≤ 0.2 Mpa
	Composite ultrafiltration membrane	Hollow fiber PAN Filtering accuracy=0.01 μm Pressure inlet= 0.1–1.6 Mpa Pressure drop ≤ 0.016 Mpa Effective membrane area=12 m^3 Nutshell Activated Carbon Length=100 mm Filtering accuracy=0.5 μm Pressure inlet ≤ 0.68 Mpa Iodine adsorption value ≥ 1200 mg/g
	Reverse	Polyacrylamide

	osmosis membrane	Filtering accuracy=0.1 nm Pressure inlet= 1–5 Mpa
	Post activated carbon	Coconut shell activated carbon Filtering accuracy=5 μm Pressure inlet ≤ 0.4 Mpa Iodine adsorption value ≥ 1000 mg/g

Table S3. Spatial and temporal distribution of As in drinking water in each district.

	Districts	Arithmetic mean(ug/L)	Maximum(ug/L)	minimum(ug/L)	Relative deviation(%)
Jinze Reservoir	Fengxian	0.406	0.725	0.123	0.248
	Fengxian	0.789	0.955	0.550	0.171
	Jinshan	0.940	1.195	0.721	0.240
	Jinshan	0.911	1.032	0.790	0.105
Qingcaosha	Yangpu	0.269	0.393	0.112	0.121
	Yangpu	0.557	0.652	0.432	0.100
	Jing'an	0.417	0.605	0.263	0.175
	Jing'an	0.399	0.954	0.162	0.375
	Pudong	0.309	0.416	0.246	0.078
	Pudong	0.329	0.412	0.272	0.064
	Huangpu	0.390	0.624	0.248	0.171
	Huangpu	0.429	0.624	0.248	0.181
Chenhang	Baoshan	0.531	0.956	0.333	0.291
Reservoir	Baoshan	0.619	0.829	0.239	0.260
Dongfengxisha	Chongming	0.238	0.952	0.000	0.476
Reservoir	Chongming	0.139	0.554	0.000	0.277

Table S4 Concentrations of total arsenic in drinking water and in the effluent of water purifiers in each district (μg L^{-1}).

Districts	Tap water	After RO processing	After NF processing	After UF processing
Fengxian	0.825	0.286	0.247	0.685
Jinshan	1.195	0.387	0.324	0.904
Yangpu	0.652	0.194	0.125	0.482
Jing'an	1.168	0.299	0.207	0.929
Pudong	0.315	<0.09	<0.09	0.248
Huangpu	0.248	<0.09	<0.09	0.154
Baoshan	0.879	0.249	0.207	0.612
Chongming	<0.09	<0.09	<0.09	<0.09

Note: The limit of detection for total arsenic determination by ICP-MS is 0.09μg L^{-1}. For calculating the health risk for values below the limit of detection, 0.09/2 = 0.045μg L^{-1} was chosen for calculation.