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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Hydrochemical characteristics of the hot spring waters in the Kangding district related to the Lushan M_S 7.0 earthquake in Sichuan, China" *by* Z. Chen et al.

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Comment 5: - Conclusions. The observed changes in groundwater composition are clearly related to the seismic event, but are a consequence of the seismic event rather than a precursor of it. The authors talk invoke in general terms the water rock interaction processes in order to explain some chemical changes, but show only the overall reaction of CaCO3 dissolution.

Thank you very much for this suggestion. The reply to each comment is as followed: The Lushan Ms 7.0 earthquake occurred on 20 April 2013. Actually, the latest data

were measured in 2010, and there were no obviously hydrochemical variations before 2010. However, the hydrochemical anomalies were observed 3-5 days after the main shock, and the amplitudes were obviously, as high as 231.9 mg L-1. Usually, hydrochemical anomalies related to earthquake can continue to about one month after the main shock (Du et al., 2008), such as those related to the Wenchuan Ms 8.0 earthquake with the epicenter 300km northeast to that of the Lushan Ms 7.0 earthquake (Chen et al., 2014). Therefore, the observed hydrochemical anomalies after the Lushan Ms 7.0 earthquake could be the continued precursory related to the main shock. In addition, 36 aftershocks with ML higher than 4.0 occurred within 5 days after the main shock. Therefore, the aftershocks could have play an important role in producing the hydrochemical anomalies observed after the main shock. We had made the modification in the text.

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Table 1. Physico-chemical parameters of the spring waters.

Longitude (E)	Latitude (N)	pH	T ℃	TDS mg L^{-1}	K^+ mg L^{-1}	Na^+ mg L^{-1}	Ca^{2+} mg L^{-1}	Mg^{2+} mg L^{-1}	F^- mg L^{-1}	Cl^- mg L^{-1}	Br- mg L^{-1}	SO_4^{2-} mg L^{-1}	HCO_3^- mg L^{-1}	I_S	Chemical type
		8.4	80.5	1306.1	41.2	396.8	13.2	13.2	1.5	336.2	0.5	52	440.3	-4.1	Na-$ClHCO_3$
		8.5	80.0	1395.4	40.6	367.2	13.4	13.6	2.6	328.5	1.1	50	485.5	-4.0	Na-$ClHCO_3$
101.96	29.98	8.4	83.0	1353.8	42.7	367.4	13.7	13.5	2.4	320.9	0.5	49.7	443.1	-4.1	Na-$ClHCO_3$
		8.5	83.0	1273.6	41.5	349.7	13.8	13.8	0.1	300.8	0	50.6	447.2	-4.0	Na-$ClHCO_3$
		8.6	83.0	1453.6	44.3	346.2	23.7	16.2	2.2	261.8	0	52.8	506.4	-3.9	Na-HCO_3Cl
		8.1	70.8	2044.9	53.2	510.8	16	31.4	3.1	220.7	1	8.3	1200.4	-4.4	Na-HCO_3
		8.2	70.2	2130.5	52.7	518.4	17.4	31	3.2	227.4	1	8.6	1270.9	-4.3	Na-HCO_3
101.96	29.98	8.2	73.1	2025.9	52.3	516.7	16.7	30.8	3	226.2	0.7	8.3	1171.3	-4.3	Na-HCO_3
		8.3	70.2	2096.9	51.6	507.9	16.3	31.1	3.2	207.6	0	8.3	1270.9	-4.2	Na-HCO_3
		8.3	73.2	2086.8	53.3	506.6	13.9	32.1	2.8	220.2	0	8	1250	-4.2	Na-HCO_3
		8.4	54.5	681.6	3.1	208.8	4.9	0.1	26.7	10.6	0	17.6	342.1	-4.1	Na-HCO_3
		8.5	53.8	705.5	3.1	219.8	4.4	0.1	26.4	10.6	0	17.3	338.1	-4.0	Na-HCO_3
101.86	30.01	8.4	53.4	650.3	3	207.1	4.4	0.1	27	9.6	0	16.6	346.6	-4.1	Na-HCO_3
		8.2	53.8	663.2	2.9	208.8	4.7	0.1	27.1	9.8	0	16.4	305.1	-4.3	Na-HCO_3
		8.4	54.2	683.4	2	207.4	3.7	0	26.8	8.9	0	6.8	340	-4.1	Na-HCO_3
		7.9	39.1	843.4	23.5	150.5	22.1	44.1	1.2	43.9	0	114.6	443.5	-4.6	NaMg-HCO_3
		7.8	39.4	919.7	22.5	150.7	22.1	44.7	1.4	40.4	0	107.1	530.9	-4.7	NaMg-HCO_3
101.95	30.09	8.1	40.6	926.4	22.4	146.3	20.2	44.5	1.2	43.9	0	109.5	538.4	-4.4	NaMg-HCO_3
		8	40.6	935.5	23.7	157.1	20.9	43.8	1.1	41	0.9	111.6	535.4	-4.5	NaMg-HCO_3
		8.3	41.0	1094.1	26.2	156.1	57.1	47.8	3.6	43.6	0	104.6	655	-4.2	NaMg-HCO_3
		7.9	45.6	1287.5	9.4	422.7	12.5	9.7	3.8	148	1	28.9	545.2	-4.6	Na-HCO_3
102.06	29.75	8.2	44.1	1167.8	9.7	365	12.8	9.4	3.8	144	1.3	24.7	597.2	-4.3	Na-HCO_3
		8.3	42.8	1289.9	9.2	360.6	12	9.4	3.4	148.4	1	24.1	597.2	-4.2	Na-HCO_3

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Fig. 1. The revisions for the table and fig.3