Reviewer 2#

1. Line 16: “the post-seismic discharge of 85~273 m^3.” Is this daily or hourly discharge?

Response: The calculation results is obtained from fitting the monitoring data of flow rates for 20 days after earthquakes. Thus, the post-seismic discharge of 85~273 m^3 is the total excess water recharge to the aquifer from deeper aquifer in 20 days after earthquakes. We have revised it in Line 17 of manuscript.

2.The authors state that there is no barometric pressure record in the well, but could it be possible to get the barometric pressure from nearby place? Sometime the barometric pressure may have large impact on the water level fluctuation.

Response: As response to Reviewer 1#, we collected the monitoring data of barometric pressure in Simao City, and identified the effect of barometric pressure on the variation of water level by the wavelet coherence and tidal analysis. Taking EQ1 as an example to analyze. The result of wavelet coherence indicates that the variation of water level is affected by barometric pressure. The result of tidal analysis indicates that the tidal components extracted from the water level time series under and without the influence of barometric pressure are similar. Thus, the new analysis supports our idea that barometric pressure fluctuation would not have effect on the result of our tidal analysis.

We have added the discussion in Line 216~218 of manuscript and Text S5 in the supporting information.

3. Temperature fluctuations seem to be affected by air temperature (Figure 3). Thus, I think that the effect of seismic activities on temperature may be more remarkable by removing the interference of air temperature with water temperature.

Response: Wavelet coherence is employed to analyze the correlation between water temperature and air temperature in time domain and frequency domain. Taking EQ1 as an example to analyze. The result of wavelet coherence indicates that there is no correlation between water temperature and air temperature. In addition, the temperature probe is located about 100m below the water surface, which is helpful for removing the influence of air temperature on the variation of water temperature. Thus, air temperature fluctuation would not have effect on the variation of water temperature. We have added the discussion in Line 139 of manuscript and Text S3 in the supporting information.

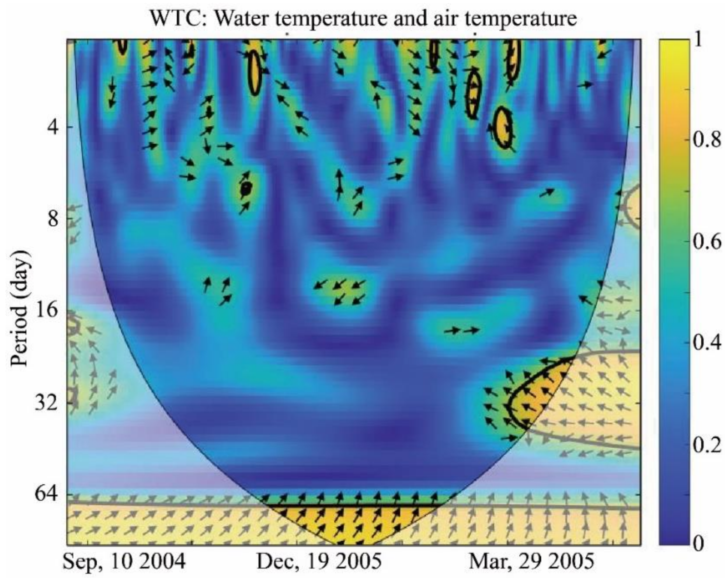

Figure R1. Wavelet coherence between water temperature and air temperature. The thick black contour specifies the 95% confidence level. The arrow directions indicate the relative phase relationship: in-phase pointing right, antiphase pointing left, and phase-leading by 90° pointing straight down.

4.What is the different effect of static and dynamic water level observation on the tidal signal? Why dynamic water level observation would show more sensitive to earthquake? Please give a detailed explanation.

Response: We have added the discussion in Line 96~104 of revised manuscript.

For the earthquake groundwater monitoring, the wells tapped in the confined aquifers are preferred. The static water level observation is used for the non-artesian well, while the dynamic water-level observation is used for the artesian well tapped in well-confined aquifers. Thus, the dynamic water level observation wells would tend to have better confinement than the non-artesian flowing wells. Previous studies revealed that three external influence factors affect the sensitivity of the earthquake-induced hydrogeological responses, including peak ground velocity (PGV), aquifer confinement, and well location relative to local faults (Zhang et al., 2021). In additional, many studies have proposed that the tidal signals from aquifers with different confinement are different. The aquifers with better confinement could record clear and large magnitude of M_2 tidal wave while the aquifer with less confined may show weak tidal signals (Rahi, 2010; Turnadge et al., 2019;

Zhang et al., 2021). Thus, dynamic water level observation tapped would tend to show more sensitive to earthquake.

5.Line 112 the authors mentioned that there is stable isotope result from this well, could this result be used to estimate the recharge elevation? If this is feasible, this may provide additional support of the concept model proposed in the manuscript.

Response: We have added the discussion in Line 121~126 of revised manuscript.

The δD and $\delta^{18}O$ values of groundwater from Dazhai well are -80.63‰ and -11.17‰, respectively, which are close to the global meteoric water line GMWL: $\delta D = 8\delta^{18}O + 10$. The result of stable-isotope indicate recharge is primarily from meteoric waters. According to the relationship between recharge elevation and δD in Eastern Tibetan Plateau $\delta D = -0.026H(m) - 30.2$ (Yu, 1997), the recharge elevation of groundwater from Dazhai well is about 1940m. The estimated recharge elevation is close to the elevation of mountains nearby Dazahi well.

6.The authors selected 14 earthquakes that cause co-seismic response, and discussed the relationship between seismic energy density limits and the response, here I am wondering whether the authors could also plot those earthquakes that showed no response, and see if there is any limits exist between the response and non-response earthquakes?

Response: We have added the discussion in Line 167~170 of revised manuscript.

We have plotted those earthquakes that showed hydrological response and no hydrological response in Figure R2. Orange triangles represent earthquakes with hydrological response collected from Wang and Manga (2010). Blue squares represent 14 earthquakes in this study that induce hydrological response in DZ well. White circles represent earthquakes without hydrological response in DZ well.

Wang and Manga (2010) collected and analyzed the global earthquake-induced hydrological responses, and found that the seismic energy density > 10^{-3} J/m^3 can induce hydrological response. As is shown in Fig R1, although the seismic energy density of most earthquakes are < 10^{-3} J/m^3, the seismic energy density of few earthquakes ranging from 10^{-3} J/m^3 to 10^{-2} J/m^3 cause no hydrological response. The seismic energy density of 14 earthquakes with hydrological response are > 10^{-3} J/m^3 (ranging from 0.005 J/m^3 to 2.242 J/m^3).

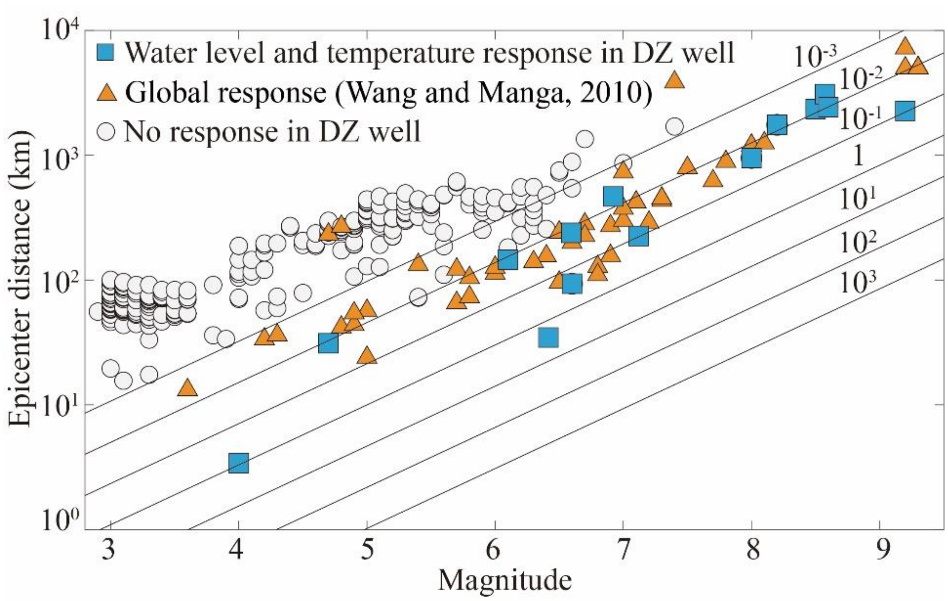

Figure R2. Distribution of earthquake-triggered hydrologic changes as a function of earthquake magnitude and distance. Orange triangles represent earthquakes with hydrological response collected from Wang and Manga (2010). Blue squares represent 14 earthquakes of this study that induce hydrological response in DZ well. White circles represent earthquakes without hydrological response in DZ well.

7. As for the static strain mechanism, there are many parameters such as W, L, D_j…, how these values are determined? If these are empirical, then citation should be added.

Response: We have added the references of empirical value and assumption value in the static strain mechanism.

8. Have the authors sampled the water samples from the shallow and deep aquifers? Is there any difference in hydrochemical components of groundwater from the two aquifers?

Response: We have added the discussion in Line 81~84 of revised manuscript.

We have sampled groundwater from Dazhai well and Dazhai deep well. The hydrochemical type of Dazhai well and Dazhai deep well are HCO_3-Na·Ca and HCO_3-Ca· Na, respectively. There is no significant difference in groundwater hydrochemical type which are sampled from the shallow and deep aquifer.

Table R1. The ion concentration of groundwater samples.

	K^+ (mg/L)	Na^+ (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	HCO_3^- (mg/L)	NO_3^- (mg/L)	Cl^- (mg/L)	SO_4^{2-} (mg/L)
DZ Well	1.26	47.15	37.92	6.74	267.21	0.59	0.94	9.98
DZ deep well	1.66	42.84	40.99	10.58	288.632	0.41	0.7	6.49

9. Line 136: What does ‘Mk’ mean?

Response: mK means millikelvin. 1 mK is equal to 0.001℃.

References:

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Rahi, K.A., 2010. Estimating the hydraulic parameters of the Arbuckle-Simpson aquifer by analysis of naturally-induced stresses, Ph.D. dissertation. Oklahoma State University.

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