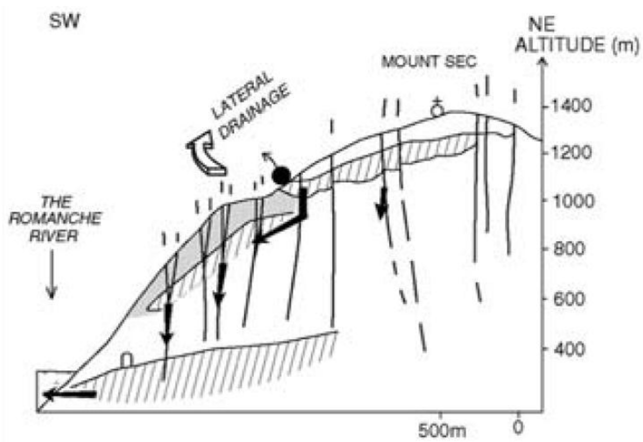
We would like to thank Referee #1 for his/her interest in the topic and for valuable comments to improve the manuscript. A point-by-point response to the comments is as follows:

General comments:

1: The site description, deformation mechanism and rainfall triggering have been improved to explain how the geology and the structural setting influence groundwater circulation and how the groundwater flow path is developed. A preliminary version of the site description updates can be found in the appendix A. If necessary, it can be modified according to the comments of other referees.

The recharge area is defined following geological and hydrogeochemical studies of Vengeon (1998), Guglielmi et al. (2002) and Mudry et Etievant (2007). The following figure shows a sketch of the conceptual groundwater flow defined by Guglielmi et al. (2002). In addition the sensitivity analysis allows to refine the estimation of the recharge parameters if a bias is introduced by the delimitation of the recharge area.

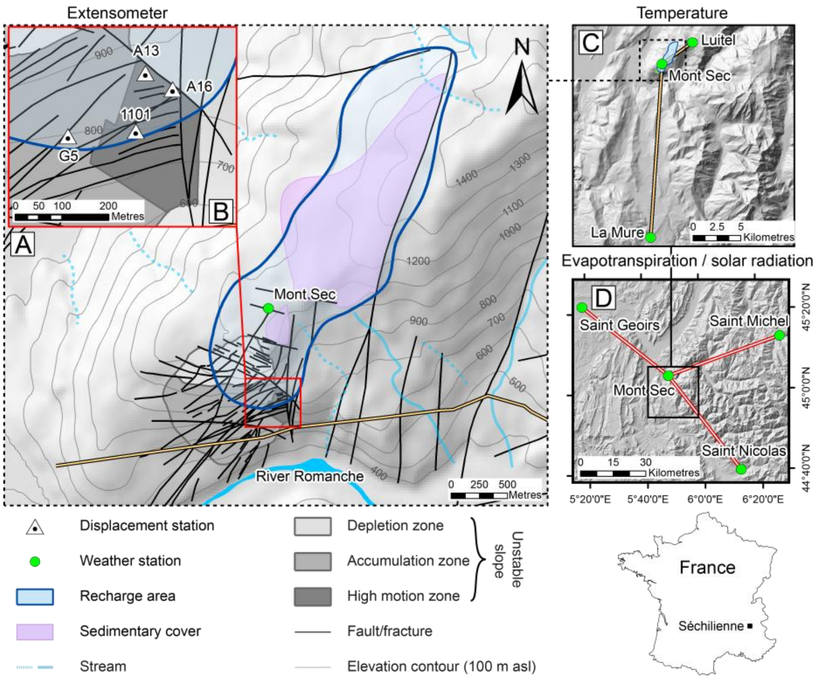


To clarify how the recharge area is delimited, we propose to modify the first paragraph of the section 4.2 as follow:

'The delimitation of the recharge area of the Séchilienne landslide is based on the geological and hydrochemical studies of Vengeon (1998), Guglielmi et al. (2002) and Mudry and Etievant (2007). The landslide perched aquifer is mainly recharged by the perched aquifer of the sedimentary cover. Therefore, the recharge is delimited according to the spatial extent of the sedimentary cover. Mudry and Etievant (2007) showed that the groundwater flow of the entire Mont-Sec massif is controlled by faults and fractures. Thus, the N20 fault bordering the

sedimentary cover to the east as well as the N-S fault zone bordering the landslide to the east are structures which delimitate the recharge area. The scarcity of informations does not allow to accurately define the actual extent of the recharge area. This uncertainty can introduce a bias in the estimation of the parameters of the recharge area. The sensitivity analysis mentioned in Section 2.6 allows to compensate for the possible biases.'

Further, the figure 3 will integrate the spatial extent of the sedimentary cover:



2: In this study, we analyse displacements measured once a day. This measurement is actually a daily displacement and is equivalent to a displacement velocity in mm/day. For the sake of simplicity we propose to use the term displacement instead of daily displacement. We propose to modify the section 2.1 with the following sentences:

For these reasons, this study is based on displacement and weather data recorded at a daily time-step. For the sake of simplicity, the daily displacement, equivalent to a velocity measurement in mm/day, is hereafter named displacement.'

In the part of the text preceding these sentences, the displacement will be referred to as displacement velocity.

The method develop to approximate the groundwater saturation state allows to provide a landslide response-time analysis with the shift factor and the cumulative period from the decreasing sum. We propose to elaborate on this point in the section 4.4 with the following sentences:

'The cumulative period and the shift factor deduced from the decreasing sum allow to determine the response-time of the Séchilienne landslide to the rainfall events. Displacement stations located in the high motion zone show homogenous time delays with shift factors of 2 to 3 days. The average cumulative periods beyond which precipitation or recharge have no longer any influence on the landslide destabilisation are estimated at about 50 days for rainfall and 75 days for recharge. The station G5 shows significantly different time delays and cumulative periods, whatever the precipitation or recharge data are used. This difference can be explained by the low signal-to-noise ratio which makes the correlations difficult to interpret.'

Table 6 from the manuscript:

			← Precipitation / recharge			→
Extenso-meter	Displacement Q1/median/Q3 mm/day	LBCI of NH1	Cumulative period (n) day	Shift factor (β) day	Weighting factor (α)	R^2
1101	1.75 / 2.50 / 3.84	0.124	42 / 68	2 / 2	0.0714 / 0.0914	0.284 / 0.495
A13	1.18 / 1.75 / 3.41	0.145	52 / 82	3 / 2	0.1019 / 0.091	0.275 / 0.520
A16	1.94 / 2.98 / 4.39	0.163	64 / 76	2 / 2	0.1628 / 0.1682	0.343 / 0.586
G5	0.02 / 0.05 / 0.08	0.144	8 / 132	0 / 6	0.0394 / 0.0110	0.0006 / 0.243

3: We agree with this comment about our paper, but we prefer to wait for the comments of the other referees before addressing this comment

4: The revised manuscript will be proof-read by an English native speaker.

Specific comment:

1: modified in the revised manuscript

2: reference added in the revised manuscript

3: modified in the revised manuscript

4: Typesetting error, corrected in the revised manuscript

5: modified to earth flow in the revised manuscript

Appendix A:

Geological settings

The Séchilienne landslide is located on the right bank of the Romanche River, on the southern slope of the Mont-Sec Massif (Fig. 3). The site is located in the French Alps. The climate is mountainous with a mean annual precipitation height of 1200 mm. The geological nature of the area is composed of vertical N-S foliated micaschists unconformably covered by Carboniferous to Liassic sedimentary deposits along the massif ridge line above the unstable zone. Quaternary glacio-fluvial deposits are also present. The Séchilienne landslide is delineated eastwards by a N-S fault scarp and on northwards by a major head scarp of several hundred meters wide and tens of meters high below the Mont Sec. The slope is cut by a dense network of two sets of near-vertical open fractures trending N110 to N120 and N70 (Le Roux et al. 2011).

Deformation mechanism and rainfall triggering

The landslide Séchilienne is characterized by a deep progressive deformation controlled by the network of faults and fractures. A particularity of the Séchilienne landslide is the absence of a well-defined basal sliding surface. The catchment is affected by a deep toppling movement of the N50-70° slabs to the valley (accumulation zone) coupled with the sagging of the upper slope (depletion zone) beneath the Mont Sec (Vengeon, 1998; Durville et al., 2009; Lebrouc et al., 2013). A very active moving zone is distinguishable from the unstable slope where high displacement velocities can be 10-time higher than the rest of the landslide.

The Séchilienne landslide is characterized by a good correlation between precipitations and displacement velocities (Rochet et al., 1994; Alfonsi, 1997; Durville et al., 2009; Chanut et al., 2013). Especially the seasonal variations of the daily displacement are clearly link to the seasonal variations of the recharge (high displacement during high flow periods and conversely during the low flow period). In addition, Helmstetter and Garambois (2010) showed a weak but significant correlation between rainfall signals and rockfall microseismicity. The landslide, about 150 m deep (Le Roux et al., 2011), shows a higher hydraulic conductivity than the underlying stable bedrock (Vengeon, 1998) and constitutes a perched aquifer. The fractured metamorphic bedrock beneath the landslide contains a deep satured zone at the base of the slope and an overlying thick (about 100 m) vadose zone. The hydrochemical analyses of Guglielmi et al. (2002) showed that the sedimentary deposits distributed above the landslide hold a perched aquifer which recharges the landslide perched aquifer. The groundwater flow of the entire massif is mainly controlled by the well developed network of fractures with high flow velocities (up to a few kilometre per day; Mudry and Etievant 2007).