



International Workshop on the Hydrology and Morphology of sub-alpine, semi-forested catchments

27 to 29 June, 2018, Einsiedeln/Alptal, Switzerland



Fifty years are not enough! Even after such an impressive period we think that the torrents in the Alptal valley still offer plenty of unsolved riddles and phenomenon worth being uncovered. These phenomenon are not specific for just this site, but show up in an important part of the Swiss pre-alps and similar landscapes around the world. And the processes governing hydrological, morphological, pedological etc. phenomena are basically the same everywhere. Therefore, the interrelations and mechanisms observed in the Alptal can always be used as a model for other locations where climate change, heavy rain or pollution pose a problem for streams, snow cover and groundwater.

Scientists have understood that current environmental challenges cannot be solved by exploring individual disciplines. That's why the long-term observatory in the Alptal has turned into a truly interdisciplinary field lab with the participation of geomorphologists, chemists, soil experts and engineers. As a consequence, the founder institution – the Swiss Federal Research Institute WSL – which has been operating the core of the infrastructure, has been joined by other institutions, such as ETH Zürich, University Zurich and GFZ Potsdam.

With the present workshop, it is our aim to provide a basis for additional collaborations and new research activities – together with you. We are convinced that much is still to be disclosed.

Thank you for taking the time to come here and sharing your ideas and enthusiasm with us. I cordially welcome you to this beautiful and interesting place and wish us many inspiring discussions.



Christoph Hegg, Deputy Director, WSL

How does it come about that a watershed is being observed for more than fifty years? How does it come about that generations of researchers stay in one and the same specific catchment and continue to study mechanisms behind the pathway and impacts of water there?

I guess this wasn't planned when Hans M. Keller and his team started to set up runoff stations in the Alptal valley in the mid-1960s. The concept with up to 10 runoff stations, up to 15 snow courses and several rain gauges was so ambitious that even the most optimistic person would not have expected that it would be sustained for five or more decades. Well, it was a different time with a slower pace, longer-term objectives and certainly more patience from the funding authorities. But people already knew at that time what it meant to measure discharge in small prealpine catchments over several decades. The famous runoff stations in the Emmental (called Sperbel- and Rappengraben), which were the first systematic hydrological observations in small steep torrents, had just been abandoned by WSL in 1957 and handed over to the federal office after 54 years of operation. So they had a clear idea about the challenge. Well, I can only conclude that the team of Hans M. Keller must have had unlimited enthusiasm, curiosity and fun to start such a comprehensive hydrological observatory and to continuously expand it.

But how does it come that this endeavor has been sustained for such a long time? My take is that it was the following reasons:

- Throughout the fifty years, the measurements were carried out with a high awareness of quality. Owing to this, users have had a high confidence in the data.
- In the course of the observation period, very special meteorological events have occurred. Exceptional floods, heat waves, wind storms and extreme winters. It was those events that triggered new research questions and gained public attention.
- Expanding the topics of investigation from classical forest hydrology to morphology, ecology and other disciplines was of added value for the host institution WSL and facilitated the support of the directorate.
- Due to the closeness to Zürich, the Alptal observatory could be easily used for the education of students. As a consequence numerous Master and PhD thesis were located in this catchment.
- The researchers always strove towards a good relationship with the local people and therefore received a lot of support.
- Already from the very beginning, Hans M. Keller put the Alptal measurements in an international context and cultivated an open exchange with colleagues abroad.
- Last but not least, the location is of such beauty – in all seasons of the year – that researchers always enjoyed being here.

A 50-years anniversary is a good moment to look back and appreciate and reflect factors of success (or failure) of our long-term study. But we also want to use this opportunity to create new reasons and ideas for continuing this endeavor. I'm glad we can do this together. So, welcome to an inspiring and fruitful exchange here in this beautiful region.



Manfred Stähli, Head RU Mountain Hydrology and Mass Movements, WSL



From a small team work to a broad community issue

“At the end of the 1950-ties, the former head of the predecessor institute of WSL (EAFV) decided to re-intensify forest-hydrological research. To this end, Hans M. Keller, a young motivated forest engineer was sent for two years to Fort Collins, Colorado, to accomplish a Master of Science in Watershed Hydrology. In 1963 he started his research at EAFV...”. This quote from the memorial publication¹ in honor of Hans M. Keller, as well as the numerous old photos from the archive tell us that, in the beginning, the hydrological research in the Alptal was a matter of only one little team representing one institution (EAFV). Hans clearly had the lead and was the driving engine behind the installation of the infrastructure; and he was (with few exceptions) the main author who published the results. In the 1980s, with the first EU-projects and Swiss National Research programs, the team of researchers in the Alptal became larger and more diverse. Investigations of sediment transport, nutrient dynamics and runoff formation complemented the original topic of forest hydrology. Over the years, more and more research groups joined and made use of the existing infrastructure and long-term data. They added their own ideas and equipment resulting in a modern environmental field lab. Today, the Mountain Hydrology unit of WSL still takes care of the basic operation and data management of the long-term measurements, but the Alptal research has definitely turned into a community issue supported by ETH Zürich, University Zürich, GFZ Potsdam and many others.

At this point, we would like to thank all the former and current staff members, students and field assistants who supported the Alptal research in the course of the passed fifty years.

Special thanks to the children of Hans M. Keller for financial support of the workshop – in particular for young participants. It is a pleasure that – even after such a long time – we can stay in contact with the family of the commendable funder of this long-term endeavor.

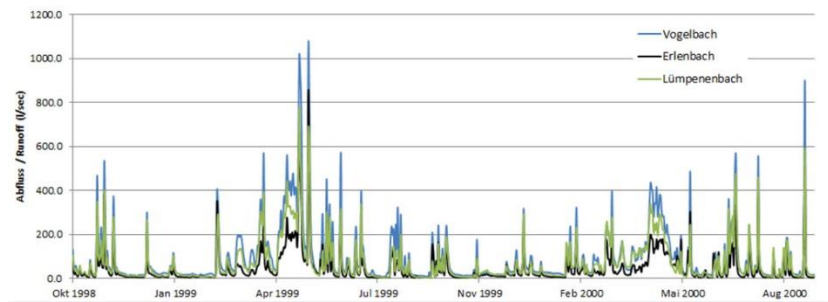


¹ Schweizerische Gesellschaft für Hydrologie und Limnologie (SGHL); Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL) (Hrsg.) 1994: Hydrologie kleiner Einzugsgebiete. Gedenkschrift Hans M. Keller. Beitr. Hydrol. Schweiz 35: 211 S.

Important events: a short chronicle of the research in the Alptal

1963	The young forest engineer Hans M. Keller returns from his education program at the University of Fort Collins and starts up a forest hydrology research team at the Swiss Federal Research Institute WSL. Very soon, he decides to locate his experimental research in the Alptal valley.
1968-08-13	The first runoff station (Vogelbach) is put into operation.
1970-04	Largest snow depth (2.75 m) and snow water equivalent (1064 mm) of the entire observation period measured at snow course Zwäcken
1974-06-23	All runoff stations are heavily damaged or even destroyed in a single flood event
1983	The new runoff station Erlenbach is set into operation.
1984-07-25	Tremendous flood event with a maximum runoff peak of 12 m ³ /s in the Erlenbach. The entire sediment basin is filled with debris after the 5-hour precipitation event producing more than 100 mm of rain.
1986	The first measurement system to record bedload transport with piezoelectric impact sensors is installed at the check dam upstream of the Erlenbach sediment retention basin.
1986-05-21	A 30 m high meteorological tower is set up in the forest to record the air quality (National Research Programme 14) to record the air quality and estimate atmospheric deposition
1993-07-30	Hans M. Keller dies in a snow avalanche at Zinalrothorn (Valais)
1993	In the frame of a European project (NITREX) three experimental plots are instrumented to observe nitrogen balance of 3 very small catchments and experimentally manipulate the N deposition to one of them.
1995-07-14	Heavy storm event producing 9.8 m ³ /s runoff in the Erlenbach; registration of the highest ever 10-min rainfall sum in the catchment (24.2 mm).
1998-99	Very snow-rich winter followed by two major flood events in spring
1999-12-26	Catastrophic wind storm (Lothar) destroys a significant fraction of the forest (including a few WSL snow courses)
2000	The piezoelectric impact sensors to record bedload transport are replaced by geophone impact sensors
2003	The chemical measurements in the three Alptal torrents become part of the National River Monitoring and Survey Programme (NADUF)
2003-04	International conference on Mountain Hydrology with excursion to the Alptal observatory
2007-06-20	Heavy flood event after a rain storm of only 1.5 hour duration with considerable bedload transport; highest ever runoff peak (14.6 m ³ /s) in the Erlenbach.
2009	Automatic basket samplers are installed to take direct bedload samples during sediment transporting flow events
2010	The hydrology group of University Zürich initiates a distributed monitoring of groundwater and small-stream runoff in the Erlenbach and Zwäckenbach catchment
2010	A comprehensive sampling of stream and precipitation water for isotopic analyses is initiated in the frame of NRP 61 (national research program)
2011	Two boxes with different slabs are installed in the check dam of the Erlenbach runoff station to measure bedload erosion.
2015	An automatic measurement system to sample and chemically analyze stream and rain water is put into operation at the Erlenbach runoff station
2016	Four miniplate accelerometer impact systems are installed upstream of the central steel plates with the geophones
2016/2017	No snow at all in the entire catchment until 4 January
2018	Technical renewal of the long-term monitoring system in the Erlenbach; 50-year jubilee





Data

During the last 50 years a wealth of data on the hydrology, nutrient dynamics, morphology and meteorological conditions of the Alptal valley and in particular of three first-order torrent catchments has been collected. These data are open available and can be used by researchers and students for their own studies.

Data directly available at envidat.ch

The most important variables of the hydrometeorological longterm monitoring in the Alptal valley can be directly downloaded - as daily mean values for the period 1968-2017 - from the WSL data portal envidat.ch.

Also directly available are snow measurements that have been acquired manually at more than 15 locations across the Alptal valley (weekly to monthly) during the last fifty years.

Data directly available at naduf.ch

Weekly data on the water quality of the three torrents Vogelbach, Erlenbach and Lümpenenbach (since 2003) can be downloaded directly from the website of the National River Monitoring and Survey Programme (NADUF).

Data available on request

The longterm hydrometeorological measurements of the three torrent catchments Erlenbach, Vogelbach and Lümpenenbach are also available at sub-daily resolution (e.g. as 10-min mean values since 1984) and can be made available upon special request.

In addition, specific data on bedload transport, groundwater dynamics, nutrient dynamics, isotope hydrology and more are available and can be requested directly from the responsible researchers.



Literature / publications

The results and conclusions from 50 years of hydrological and environmental research in the Alptal have been published in numerous peer-reviewed articles, student theses and implementation reports. An overview of publications can be found at the following website: www.wsl.ch/alptal -> **publications**

Weekly program of the 50-year jubilee

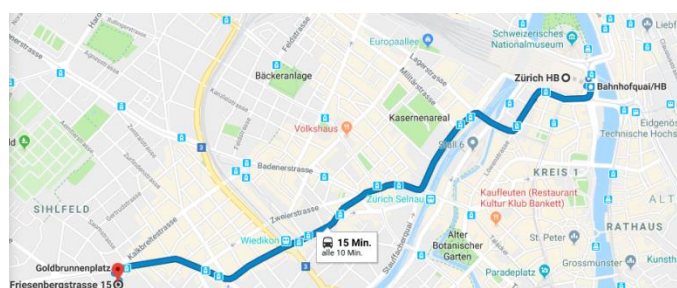
Monday, 25 June:		Where
All day	Arrival of the first participants	Hotel Neufeld, Zürich
All day	Individual meetings with organizers	WSL, Univ. Zürich
Tuesday, 26 June:		
All day	Arrival of most participants	Hotel Neufeld, Zürich
2:00 p.m.	Bus transport to EAWAG (Darcy lecture)	Hotel Neufeld, Zürich
3:00 p.m.	Darcy lecture by Masaki Hayashi	EAWAG, Dübendorf, room FC-C20
afterwards	Bus transport to Hotel Neufeld	
	Dinner in town (individually)	
Wednesday, 27 June:		
8:15 a.m.	Departure of bus to workshop location	Hotel Neufeld, Zürich
9:15 a.m.	Departure of bus for arrivals by train	Bahnhof Pfäffikon (SZ)
10:00 a.m.	Official start of international workshop	Gasthaus Etzel
12:45 p.m.	Lunch	Gasthaus Etzel
1:45 p.m.	Afternoon program workshop	Gasthaus Etzel
6:00 p.m.	Dinner	Gasthaus Etzel
8:00 p.m.	Departure of bus transfer to Einsiedeln	Gasthaus Etzel
	Arrival in Einsiedeln, accommodation	Hotel Drei Könige, Einsiedeln
Thursday, 28 June:		
8:15 a.m.	Departure of bus transport to Brunni (Alpthal)	Hotel Drei Könige, Einsiedeln
8:45 a.m.	Welcome and start field discussion / excursion	Brunni (Alpthal), Erlenbach
12:00 a.m.	Lunch (picnic in the field)	Climate station Erlenhöhe
1:00 p.m.	Continuation of field discussion / excursion	Brunni (Alpthal), Erlenbach
4:30 p.m.	Closure of field discussion day	Brunni (Alpthal), Erlenbach
5:30 p.m.	Dinner	Restaurant Brunni, Alpthal
afterwards	Departure of bus transfer to Hotel Drei Könige, Einsiedeln	
Friday, 29 June:		
8:15 a.m.	Workshop	Hotel Drei Könige, Einsiedeln
11:30 a.m.	Concluding remarks and official closure of the workshop	Hotel Drei Könige, Einsiedeln
12:00 a.m.	Lunch	Hotel Drei Könige, Einsiedeln
2:00 p.m.	Departure of bus transport to Brunni (Alpthal) for the jubilee party	Hotel Drei Könige, Einsiedeln
open	End of jubilee party; departure of bus transport to Zürich (Hotel Neufeld and WSL)	Brunni (Alpthal), Erlenbach

Accommodation in Zürich (for all participants arriving on 25 or 26 June):

Hotel Neufeld, Friesenbergstrasse 15

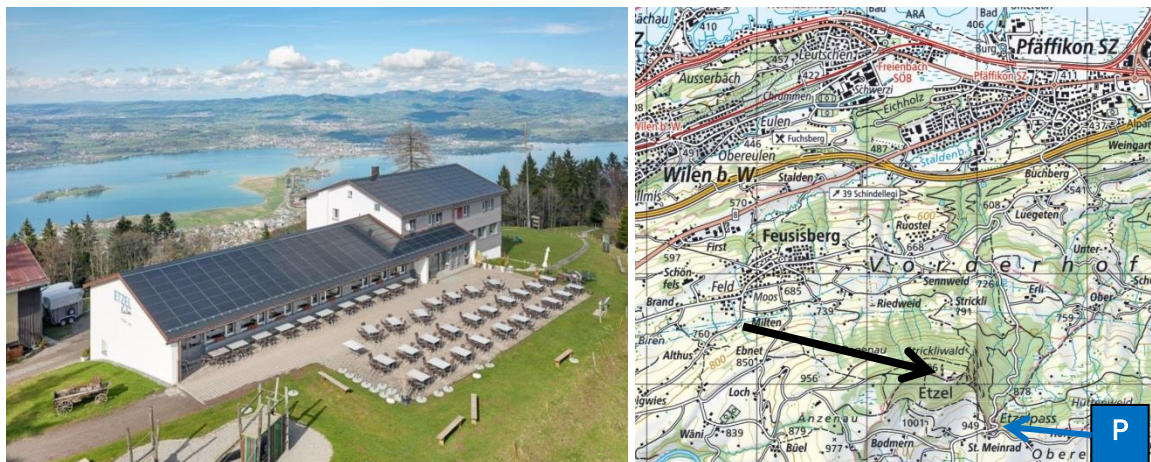
Tram Nr. 14 from Zürich HB to Goldbrunnenplatz

(<http://www.hotel-neufeld.ch/en-gb/contact>)



Detailed information for workshop day 1 (27 June 2018)

Location: Berggasthaus Etzel Kulm (hoch-etzel.ch)



Objective of the day: Introduction to Alptal research; summary of important findings/lessons learned from the studies in the Alptal; presentation of key-measurements (infrastructures); international context.

08:15: Departure of bus for participants of Hotel Neufeld, Zürich

09:15: Departure of bus for participants arriving by train at train station Pfäffikon SZ

09:00 – 10:00: Arrival of the participants, coffee

10:00 – 10:10: Official welcome address and introduction (Christoph Hegg, Deputy Director of WSL)

10:10 – 11:15: **The Alptal-research in a historical context** (How did such a long-term venture start? What were factors of success? How did research change in the course of 50 years? What can we learn for our own work from looking back at history?)
Chair: Manfred Stähli (WSL)

<i>Hydrological Research in the Alptal from then to now (short history)</i>	Manfred Stähli, WSL	15 min
<i>What can we learn from looking back? Example Hubbard Brook</i>	John L. Campbell, USDA	15 min
<i>Why do we care about the history?</i>	Stefan Ploum, SLU Umea	10 min
<i>From research to operational flood warning</i>	Käthi Liechti, WSL	15 min
<i>Discussion</i>	all	10 min

11:15 – 11:45: Coffee incl. geographical introduction from the terrace of Berghaus Etzel

11:45 – 12:45: **Runoff formation at sub-catchment scale** (Recent and ongoing studies on spatial variation in runoff processes, ground-water, and channel flow dynamics.) Chair: Ilja Van Meerveld (Univ. Zürich)

<i>Overview over previous runoff generation studies in the Alptal</i>	Jan Seibert, Ilja van Meerveld, Univ. Zürich	20 min
<i>Hillslope hydrology meets landslide hydrology</i>	Thom Bogaard, Uni Delft	10 min
<i>Spatial variation in groundwater chemistry</i>	Leonie Kiewiet, Univ. Zürich	10 min
<i>Flowing stream network dynamics</i>	Rick Assendelft, Univ. Zürich	10 min
<i>Discussion</i>	all	10 min

12:45 – 1:45 p.m.: Lunch

1:45 – 2:45 p.m.: **Exploiting chemical and isotopic information to get new insights** (What chemical and isotopic tracers can tell us about dynamic torrents; new theories and analytical approaches.)
Chair: James Kirchner (ETH Zürich)

<i>Tracers and transit times, at Alptal and elsewhere</i>	<i>James Kirchner, ETH Zürich</i>	<i>20 min</i>
<i>Isotopic dynamics of snowmelt and streamflow at Alptal</i>	<i>Andrea Rücker, ETH Zürich/WSL</i>	<i>15 min</i>
<i>Storage age selection and water quality dynamics</i>	<i>Paolo Benettin (EPF Lausanne)</i>	<i>15 min</i>
<i>Discussion</i>	<i>all</i>	<i>10 min</i>

2:45 – 3:00 p.m.: Leg stretching

3:00 – 4:00 p.m.: **Nutrient dynamics of the subalpine forest ecosystem** (Nutrients, especially nitrogen, interact with other site factors and affect the function of ecosystems. Their study requires integration across ecosystem compartments, over time and over space). *Chair: Patrick Schleppi (WSL)*

<i>Long-term nitrogen addition experiment to a subalpine forest: where does it go and what are the consequences?</i>	<i>Patrick Schleppi, WSL</i>	<i>20 min</i>
<i>Effects of nitrogen deposition on forest ecosystems: a pan-European view based on the ICP Forest measurement network</i>	<i>Peter Waldner, WSL</i>	<i>15 min</i>
<i>Response of the plant-soil system to long-term nitrogen addition in two temperate coniferous forests</i>	<i>Stefan Forstner, BOKU Vienna</i>	<i>15 min</i>
<i>Discussion</i>	<i>all</i>	<i>10 min</i>

4:00 – 4:30 p.m.: Coffee break

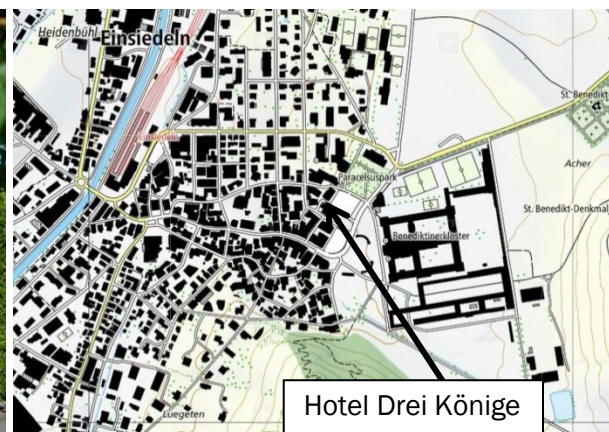
4:30 – 5:45 p.m.: **Morphology, sediment and dead-wood dynamics of a torrent** (Past and ongoing research in the Erlenbach; overarching questions and theories; uniqueness of the Erlenbach research site.)
Chair: Jens Turowski (GFZ Potsdam)

<i>Measurements of sediment transport and channel dynamics</i>	<i>Dieter Rickenmann, WSL</i>	<i>15 min</i>
<i>Overview on sediment transport work</i>	<i>Elowyn Yager, Univ. of Idaho</i>	<i>20 min</i>
<i>Outside perspective</i>	<i>Allison Pfeiffer, UC Santa Cruz</i>	<i>10 min</i>
<i>Carbon and dead-wood export from torrents</i>	<i>Jens Turowski, GFZ Potsdam</i>	<i>15 min</i>
<i>Questions/Discussion</i>	<i>all</i>	<i>15 min</i>

6:00 – 8:00 p.m.: Dinner

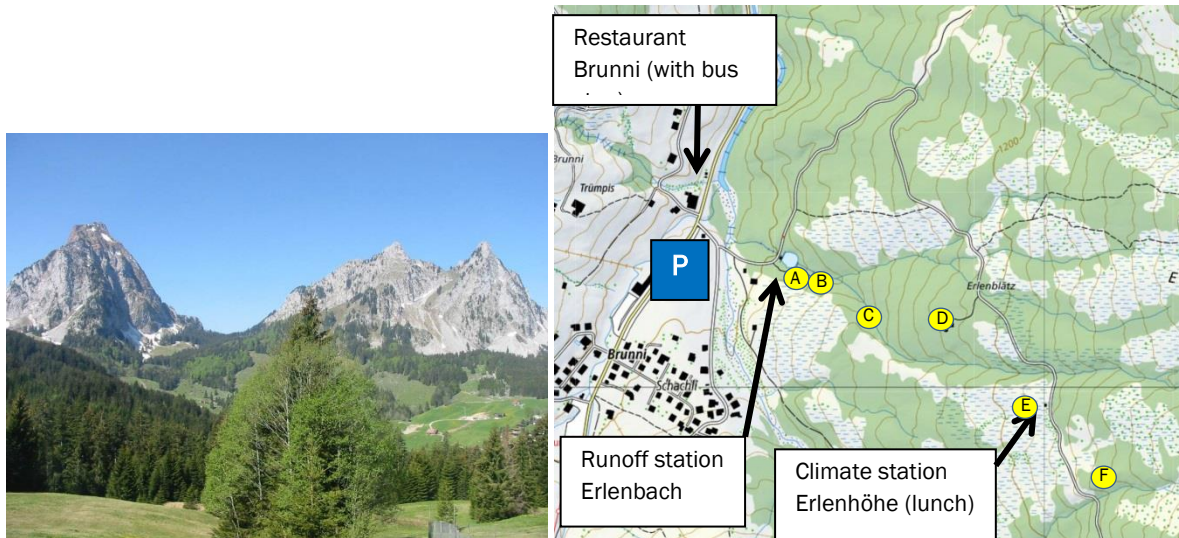
8:00 p.m.: Departure of bus to Einsiedeln

Accommodation in Einsiedeln: Hotel Drei Könige (www.hotel-dreikoenige.ch)



Detailed information for workshop day 2 (28 June 2018)

Location: Erlenbach catchment, Brunni (Alptal)



Objective of the day: To revisit past and current research questions of scientists working in the Alptal; to come up with new ideas, research questions and suggestions for infrastructure and collaboration. To expand links between different disciplines.

Clothing: We recommend trekking shoes and a rain coat or sun hat (depending on the weather).

08:15 a.m.: Departure of bus from Hotel Drei Könige, Einsiedeln

08:45 a.m.: Arrival and short welcome at the Erlenbach research site; group assignment and relocation

09:00 – 12:00 p.m.: Visit of three research sites (per group); field discussion

12:00 – 1:00 p.m.: Lunch (picnic in the field)

1:00 – 4:00 p.m.: Visit of three research sites (per group); field discussion

4:30 p.m.: Regathering at the Erlenbach runoff station; closure of the field discussion day.

05:30 p.m.: Dinner at Restaurant Brunni, Alptal

07:30 p.m.: Departure of bus transport to Hotel Drei Könige, Einsiedeln

(for individual return trips of participants leaving the workshop on Thursday evening: public busses leave Brunni, Alptal at 16:31, 17:31, 18:31 and 19:31; travel time to Zürich HB: 1 h 17 min)

Detailed information for workshop day 3 (29 June 2018)

Location: Hotel Drei Könige, Einsiedeln (seminar room)



Objective of the day: To resume the discussions of the previous day; to concretize new research ideas for the Alptal; to define common steps / products of future collaboration.

08:15 a.m.: Welcome and review of the previous day (field discussion)

Short summary reports (à 3 min) from the six field locations

08:40 a.m.: Plenary discussion (Moderation: Jens Turowski, GFZ Potsdam)

09:45 a.m.: Coffee break

10:15 a.m.: In depth discussions in groups:

- A – Further development of the infrastructure
- B – Synthesis / comparison publication(s)
- C – New project ideas
- D – Modelling
- E – other topics (brought up by participants)

11:30 a.m.: Concluding remarks and official closure of the workshop






















12:00 p.m.: Lunch

Afterwards: individual return trips of participants leaving to Zürich (and home), e.g. 12:58, 13:25, 13:58 from Einsiedeln; travel time: ~60 min.

For those joining the jubilee party:

2:00 p.m.: Departure of bus to 50-years jubilee party (Brunni Alptal)










List of workshop participants:

	Name	First name	Affiliation	Email address	Bus/Car ²	Field group
	Battista	Giulia	IFU ETH	battista@ifu.baug.ethz.ch	P	1
	Benettin	Paolo	EPF Lausanne (CH)	paolo.benettin@epfl.ch	Z	1
	Bogaard	Thom	TU Delft (NL)	t.a.bogaard@tudelft.nl	Z	1
	Campbell	John	USDA Durham (US)	jlcampbell@fs.fed.us	Z	1
	Coviello	Velio	Free University of Bozen-Bolzano (IT)	velio.coviello@unibz.it	Z	1
	Comiti	Francesco	Free University of Bozen-Bolzano (IT)	francesco.comiti@unibz.it	Z	2
	Fenicia	Fabrizio	EAWAG Dübendorf (CH)	fabrizio.fenicia@eawag.ch	P	2
	Forstner	Stefan	BOKU Vienna (AT)	stefan.forstner@boku.ac.at	Z	2
	Furlan Nehemy	Magali	University of Saskatchewan (CAN)	magali.nehemy@usask.ca	Z	2
	Gavazov	Konstantin	Swiss Federal Research Institute WSL (CH)	konstantin.gavazov@wsl.ch	Z	2
	Hagedorn	Frank	Swiss Federal Research Institute WSL (CH)	frank.hagedorn@wsl.ch	P	3
	Hayashi	Masaki	University of Calgary (CAN)	hayashi@ucalgary.ca	-	3
	Hering	Janet	EAWAG Dübendorf (CH)	janet.hering@eawag.ch	P	3
	Huber	Andreas	UIBK Innsbruck (AT)	a.huber@uibk.ac.at	Own car	3
	Jaeger	Kristin	USGS, Washington Water Science Center (US)	kjaeger@usgs.gov	Z	3
	Keiblinger	Katharina	BOKU Vienna (AT)	katharina.keiblinger@boku.ac.at	Z	4
	Kianfar	Bahareh	TU Delft (NL)	b.kianfar@tudelft.nl	Z	4
	Kohl	Bernhard	UIBK Innsbruck (AT)	bernhard.kohl@uibk.ac.at	Own car	4
	Laudon	Hjalmar	SLU Umea (SE)	hjalmar.laudon@slu.se	Z	4
	Masteller	Claire	GFZ Potsdam (DE)	mastell@gfz-potsdam.de	Z	4
	Menges	Johanna	GFZ Potsdam (DE)	menges@gfz-potsdam.de	Z	C


















² Bus transport on Wednesday morning to Berghaus Etzel: Z = Zürich, Hotel Neufeld; P = train station Pfäffikon

	Michelon	Anthony	University Lausanne (CH)	anthony.michelon@unil.ch		5
	Molnar	Peter	ETH Zürich (CH)	peter.molnar@ifu.baug.ethz.ch		5
	Pfeiffer	Allison	UC Santa Cruz (US)	ampfeiff@ucsc.edu	Z	5
	Piton	Guillaume	Irstea Grenoble (F)	guillaume.piton@irstea.fr	Own car	5
	Ploum	Stefan	SLU Umea (SE)	stefan.ploum@slu.se	Z	5
	Recking	Alain	Irstea Grenoble (F)	alain.recking@irstea.fr	Own car	6
	Ruiz Villanueva	Virginia	University Geneva (CH)	virginia.ruiz@unige.ch		6
	Schaepli	Bettina	University Lausanne (CH)	bettina.schaepli@unil.ch	P	6
	Seeger	Stefan	Albert-Ludwigs-Univ. Freiburg (DE)	stefan.seeger@hydrology.uni-freiburg.de	P	6
	Weiler	Markus	Albert-Ludwigs-Univ. Freiburg (DE)	markus.weiler@hydrology.uni-freiburg.de	P	6
	Yager	Elowyn	University of Idaho (US)	eyager@uidaho.edu	Z	6

List of organizers:

	Name	First name	Affiliation	Email address	Bus/Car ³	Field group
	Antoniazza	Gilles	University of Lausanne and Swiss Fed. Res. Inst. WSL	gilles.antoniazza@wsl.ch	Z (driver)	A
	Assendelft	Rick	University of Zürich	rick.assendelft@geo.uzh.ch	UniZH	F
	Badoux	Alexandre	Swiss Federal Research Institute WSL	alexandre.badoux@wsl.ch	WSL	1
	Bogner	Emilie	Swiss Federal Research Institute WSL		WSL	
	Fischer	Benjamin	Stockholm University (SE)	benjamin.fischer@natgeo.su.se	UniZH	2
	Hegg	Christoph	Swiss Federal Research Institute WSL	christoph.hegg@wsl.ch	own car	-
	Kiewiet	Leonie	University of Zürich	leonie.kiewiet@geo.uzh.ch	UniZH	F
	Kirchner	James	ETH Zürich	kirchner@env.ethz.ch	WSL	B
	Knapp	Julia	ETH Zürich	julia.knapp@usys.ethz.ch	Z	B
	Liechti	Käthi	Swiss Federal Research Institute WSL	kaethi.liechti@wsl.ch	WSL	3

³ Transport on Wednesday morning to Berghaus Etzel: Z = Zürich, Hotel Neufeld; P = train station Pfäffikon; WSL = WSL; UniZH = Car Ilja

	McArdell	Brian	Swiss Federal Research Institute WSL	brian.mcardell@wsl.ch	P (?)	C
	Meusbürger	Katrin	Swiss Federal Research Institute WSL	katrin.meusbuerger@wsl.ch	P	-
	Nicollier	Tobias	Swiss Federal Research Institute WSL	tobias.nicollier@wsl.ch	P (driver)	A
	Rickenmann	Dieter	Swiss Federal Research Institute WSL	dieter.rickenmann@wsl.ch	WSL	A
	Rickli	Christian	Swiss Federal Research Institute WSL	christian.rickli@wsl.ch	P	(back up)
	Rinderer	Michael	Albert-Ludwigs-Univ. Freiburg (DE)	michael.rinderer@hydrology.uni-freiburg.de	-	4
	Rücker	Andrea	Swiss Fed. Res. Inst. WSL and ETH Zürich	andrea.ruecker@wsl.ch	P	E
	Schleppi	Patrick	Swiss Federal Research Institute WSL	patrick.schleppi@wsl.ch	WSL (driver)	D
	Seibert	Jan	University of Zürich	jan.seibert@geo.uzh.ch	WSL	5
	Stähli	Manfred	Swiss Federal Research Institute WSL	manfred.staehli@wsl.ch	WSL	E
	Steeb	Nicolas	Swiss Federal Research Institute WSL	nicolas.steeb@wsl.ch	WSL (driver)	
	Studer	Björn	ETH Zürich	bjoern.studer@env.ethz.ch	?	B
	Turowski	Jens	GFZ Potsdam	turowski@gfz-potsdam.de	Z	C
	Van Meerveld	Ilja	University of Zürich	ilja.vanmeerveld@geo.uzh.ch	UniZH	F
	Von Wartburg	Jonas	Swiss Federal Research Institute WSL	jonas.vonwartburg@wsl.ch	P (driver)	
	Waldner	Peter	Swiss Federal Research Institute WSL	peter.waldner@wsl.ch	Z (?)	D
	Webster	Clare	WSL institute for Snow and Avalanche Research, SLF	webster@slf.ch	P	E
	Wechsler	Tobias	Swiss Federal Research Institute WSL	tobias.wechsler@wsl.ch	P (driver)	
	Wicki	Adrian	Swiss Federal Research Institute WSL	adrian.wicki@wsl.ch	Z (driver)	D
	Zappa	Massimiliano	Swiss Federal Research Institute WSL	massimiliano.zappa@wsl.ch	-	6

Useful information:

Train / public transport information (including time tables): www.sbb.ch

Information about the Alptal research: www.wsl.ch/alptal

Emergency number (if you get lost during the workshop): +41 79 450 09 15 (Manfred Stähli)
+41 76 280 62 23 (Käthi Liechti)

Directions for participants arriving on Monday or Tuesday in Zürich:

Transfer from Zurich Airport to Zürich HB (main station): 10 minutes by train (approximately every 10 to 15 minutes);

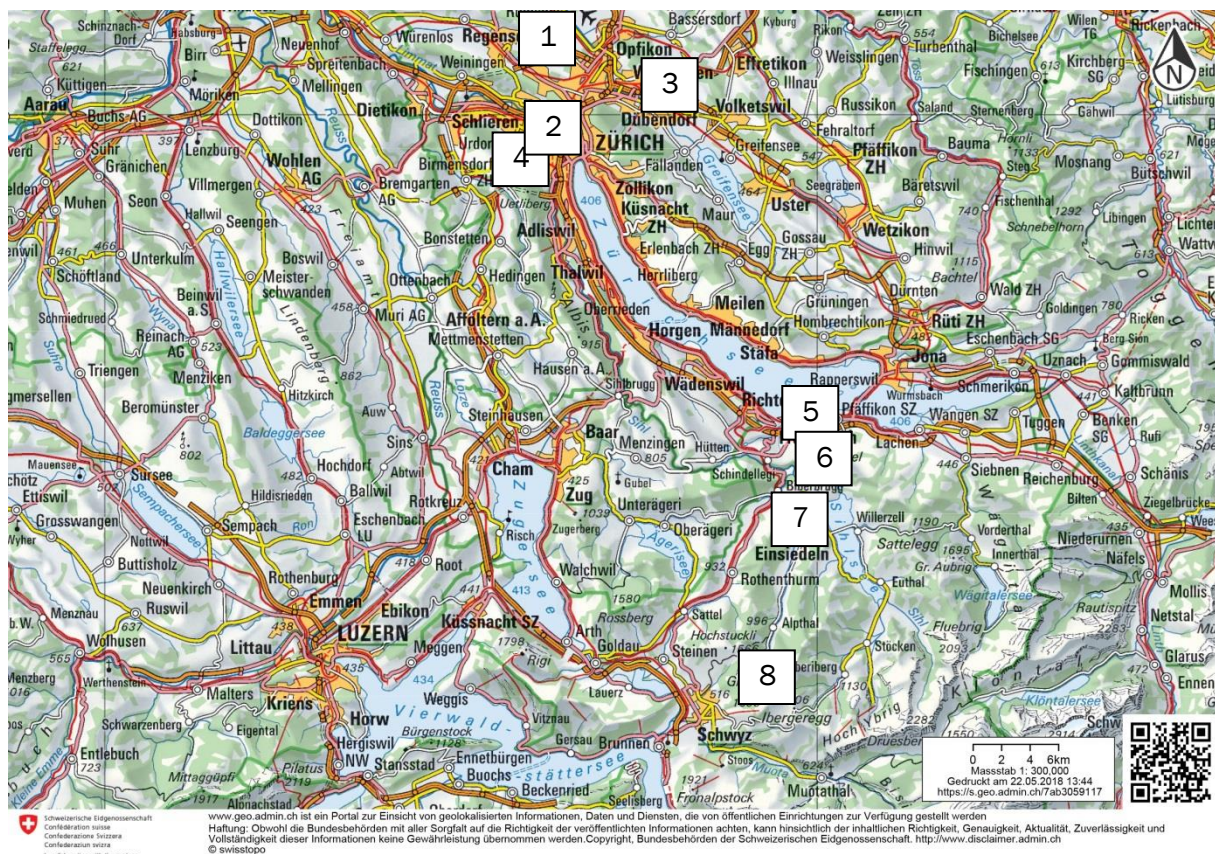
From Zürich main station to **Hotel Neufeld** (<http://www.hotel-neufeld.ch/en-gb/contact>): Tram no. 14 (in the direction of Triemli) – you can use the same ticket than you used on the train; no additional ticket is needed. Step off at tram stop “Goldbrunnenplatz”. The hotel is located just next to this tram stop.

Directions for participants arriving on Wednesday morning at Pfäffikon (SZ) train station:

Train from Geneva, Lausanne, Bern, Basel, Zürich: Train S 25 from Zürich (08:43) arriving 09:08 a.m. in Pfäffikon

Train from Chur, Sargans, Ziegelbrücke: Train S 2 from Ziegelbrücke (08:49) arriving 09:07 a.m. in Pfäffikon

Shuttle buses will wait just in front of the station.



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|-------------------|------------------------------------|-----------------------------------|---------------------------------|
| 1: Zürich Airport | 2: Zürich City (and Hotel Neufeld) | 3: EAWAG Dübendorf | 4: WSL Birmensdorf |
| 5: Pfäffikon (SZ) | 6: Berghaus Etzel | 7: Einsiedeln (Hotel Drei Könige) | 8: Brunnli (Alpthal), Erlenbach |

