U s e r Manual –

Automated Measurement Stations

This User Manual was created by the Austrian Avalanche Warning Services. For inquiries and reactions, please write to us at lawis.cartography@univie.ac.at and lawine@tirol.gv.at.

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LAWIS …

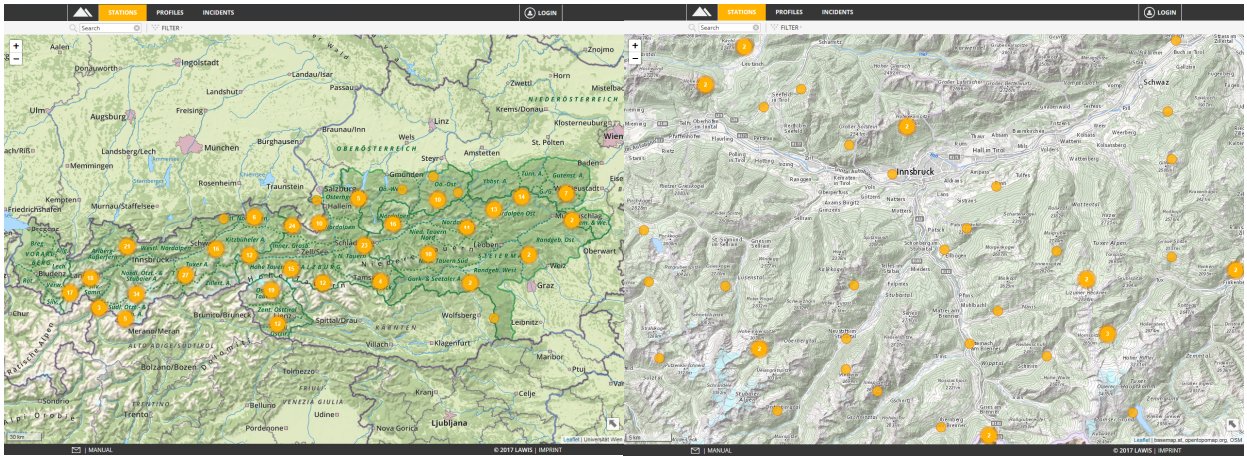
...is a tool to record and store meteorological measurements, avalanche events and snow profiles. It is made available by the Austrian Avalanche Warning Services in cooperation with the Institute of Geographical and Regional Research of the University of Vienna. The data which have been recorded are graphically presented and are freely accessible on LAWIS. The wide-ranging data network can be easily and intuitively used with various search and filter options, as well as topographical maps.

Meteorological Measurement Stations

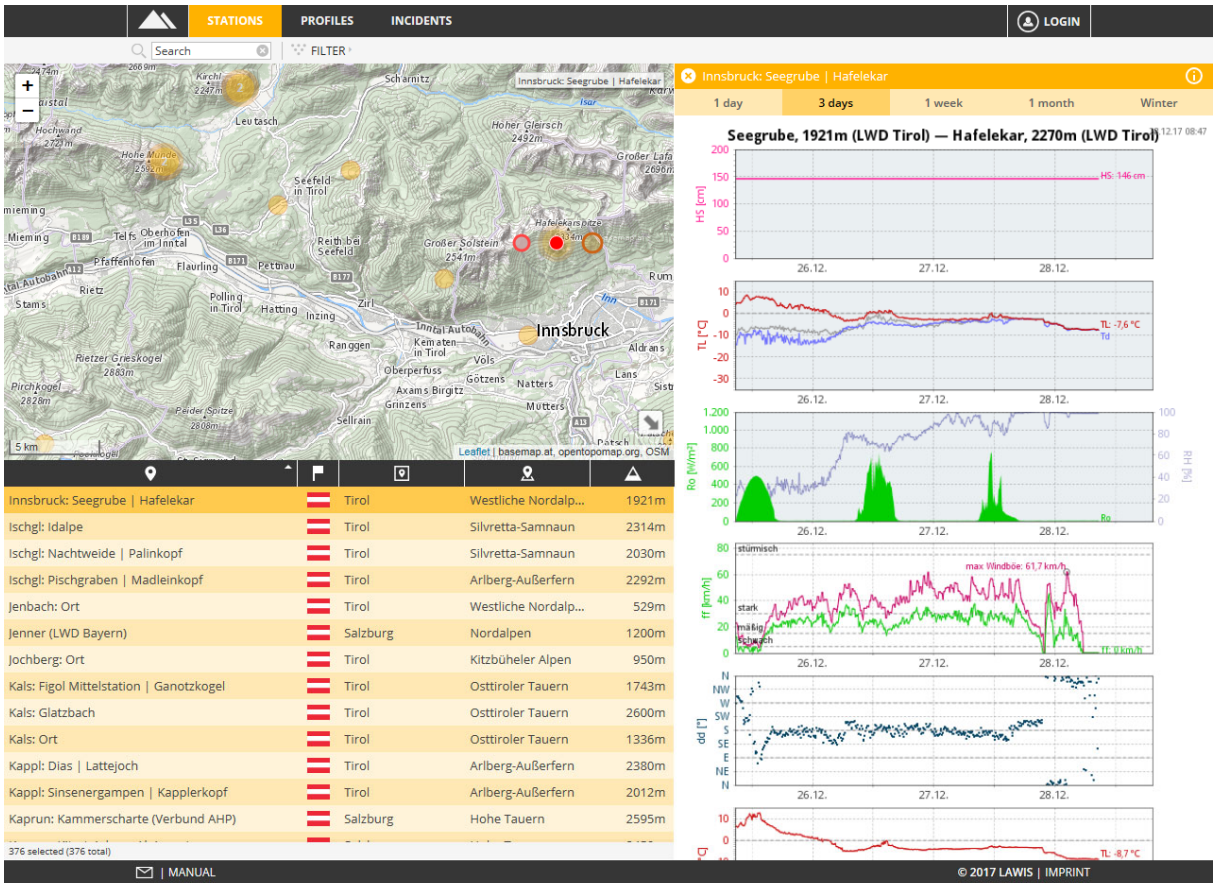
The automated measurement stations capture and record meteorological magnitudes such as temperature and wind direction, thereby making valuable contributions to the compilation of the current conditions in the atmosphere. The measurements operate continually and automatically. In addition, the automated measurement stations are checked and maintained regularly by technicians commissioned by the authorised institutes. These institutes are the Austrian Avalanche Warning Services, the Headquarters of Meteorology and Geodynamics and the Hydrographical Service of Tirol. The associated data base of the meteorological stations which is stored in LAWIS serves as a storehouse and reference work for weather data compiled. The freely available and graphically depicted data make it possible for users to obtain a swift and easy view of the contents and their development over a period of time.

1. Locating stations

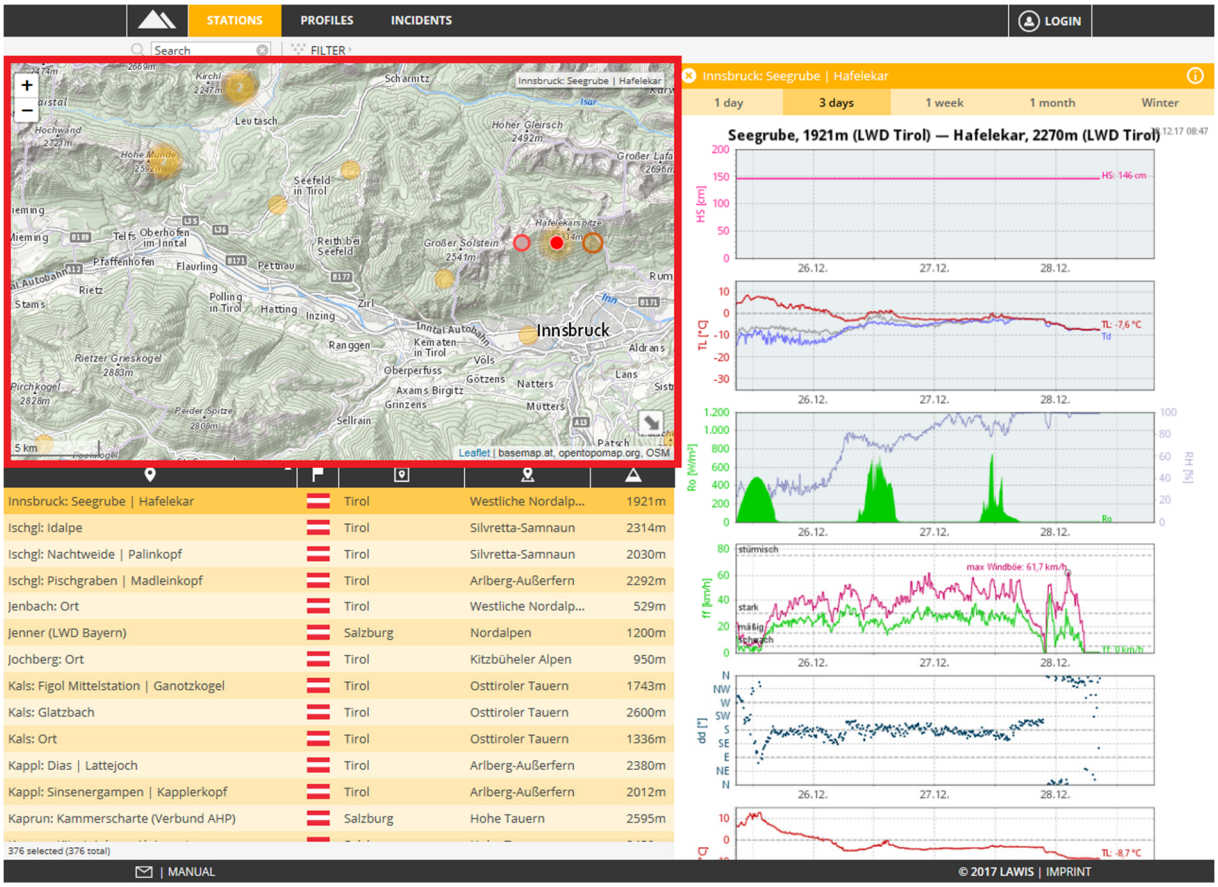
An automated measurement station can be located and pinpointed by scrolling or clicking onto the coloured circle with a number in the map. To begin with, any circle can be selected. The illustrations depict the various methods of search which are attempted.



In the view below, various tools are available which make the search for a station quick and easy. It is up to you whether you wish to search via list, map, search machine or filter. How the search functions with the various tools is explained on the following pages.

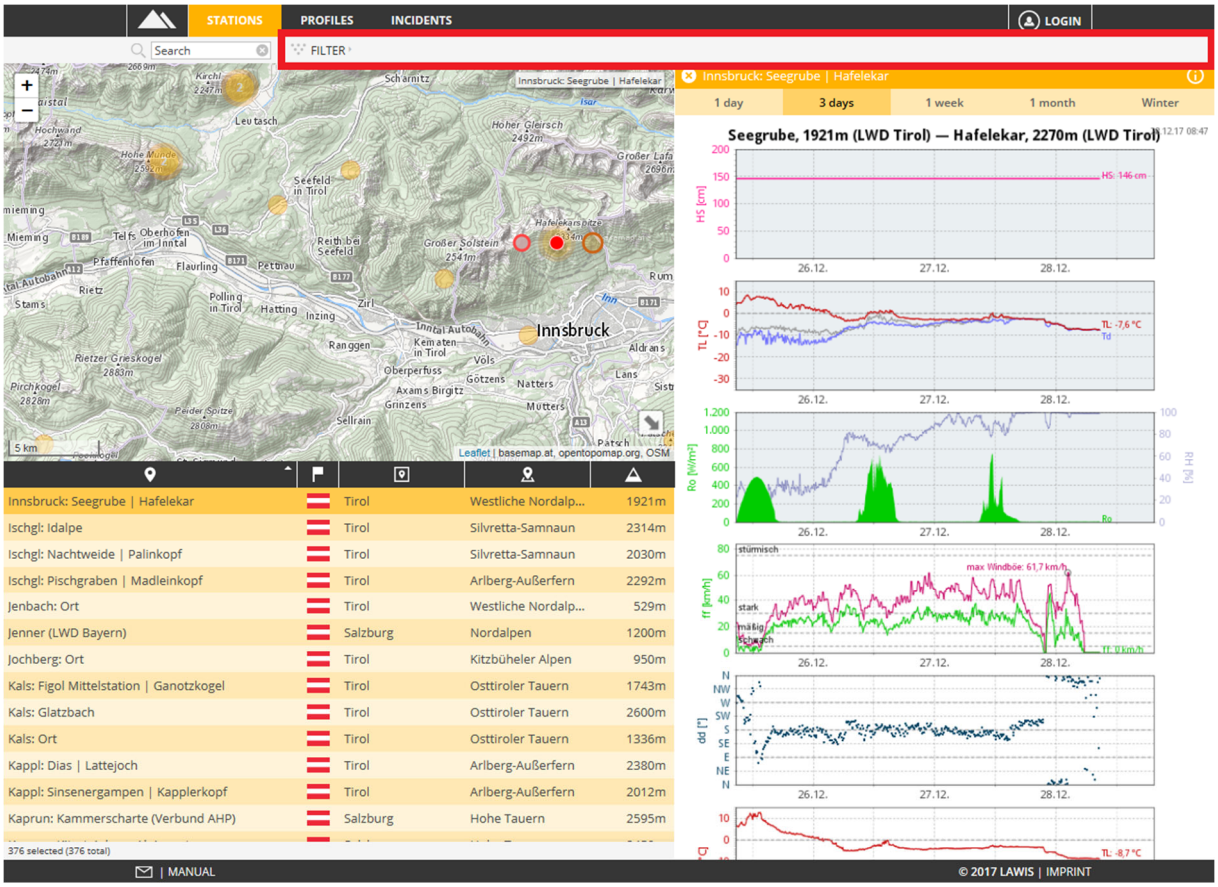


1.1. Locating stations with a map

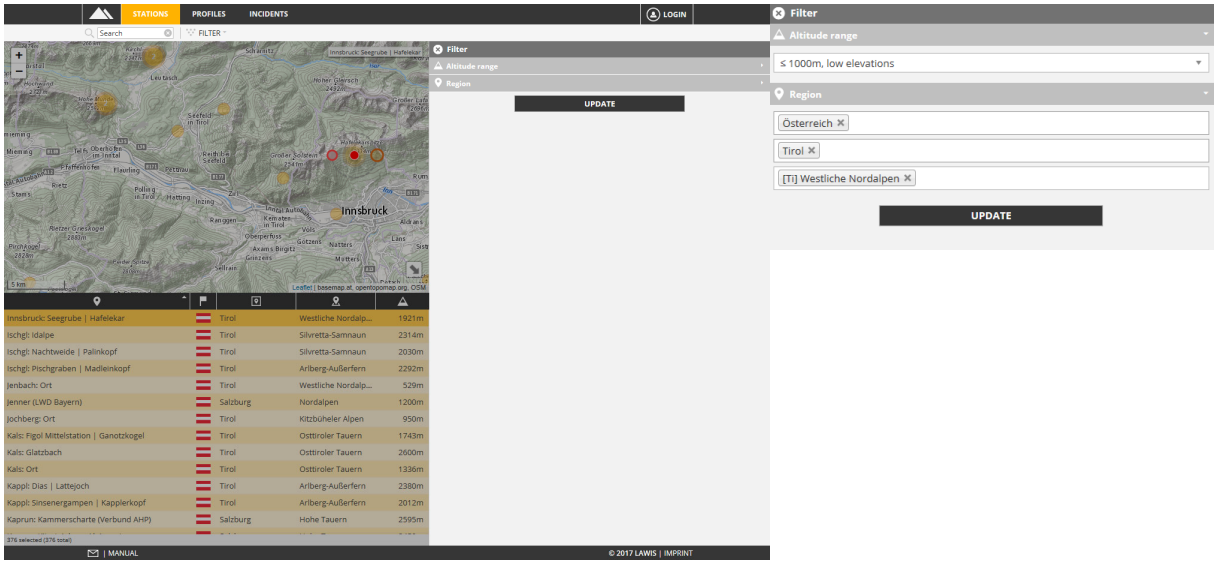


The map provides an overview of where the automated measurements stations are located. The interactive design of the map makes it possible for the user to slide the map or zoom in and out. By clicking onto a weather station, the corresponding point on the map is marked in red. Making this selection then also leads to opening the graph of measurement stations at the right.

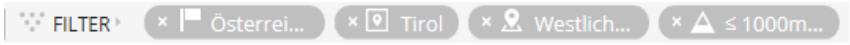
1.2. Locating stations with a filter



After selecting FILTER, a gray-marked area in the right margin opens. Here you can limit or more closely define altitude and region. By selecting the “update” space the selected filter criteria are executed. Only those events are shown which fulfil the selected criteria.



As soon as you have selected your filter criteria, you can see the selected filter criteria in the graph in the top line. They are marked in gray.



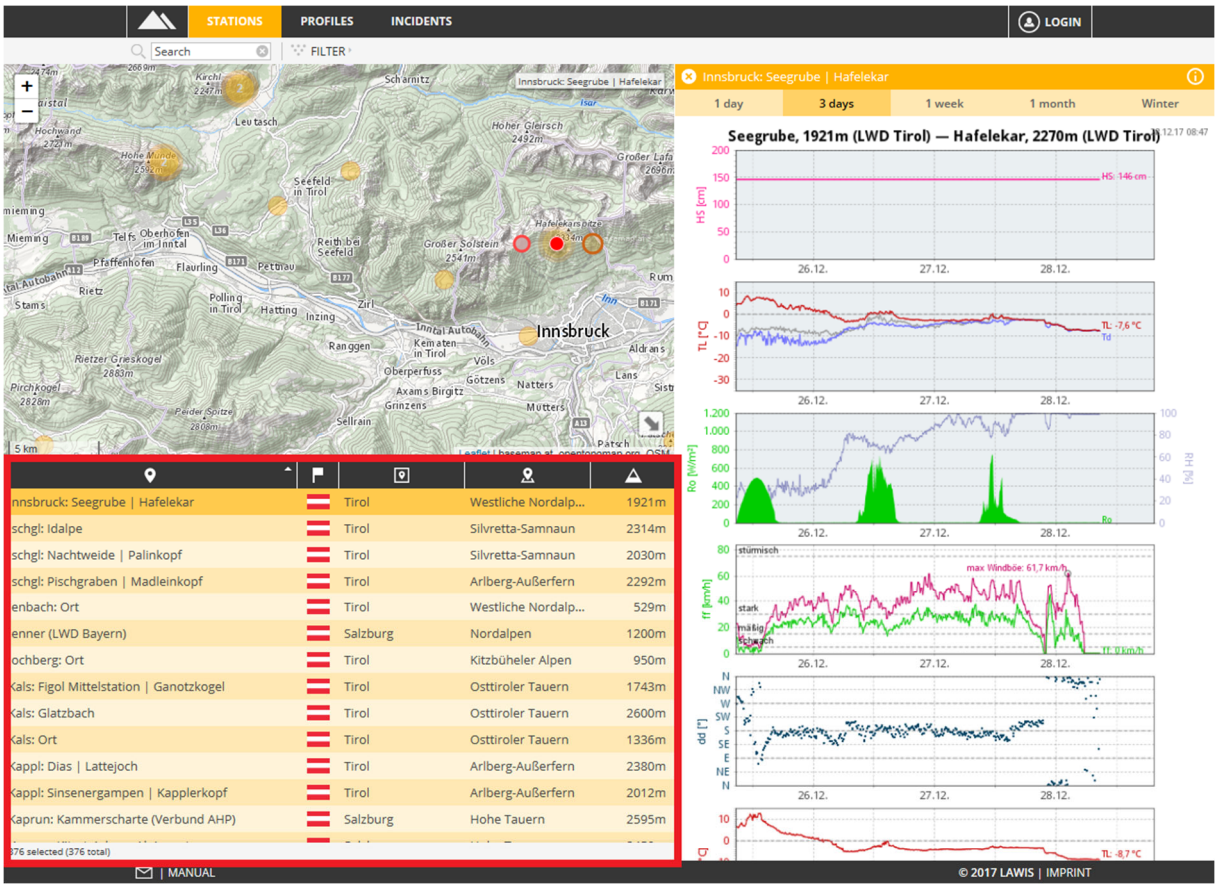
If the event you are seeking is not found among the selected criteria, you can remove the individual filter criteria with one click on x (to the left of each criterium).

1.3. Locating stations with a list

With the icons between the depiction and the list, you can sort the events you seek according to station name, town, province, region, altitude, in either ascending or descending sequence.

By scrolling up or down it is possible to view the overall contents of the list. In the pale gray-marked space beneath the list you can see whether the entire data base is contained in the list or only a reduced amount of data was selected.

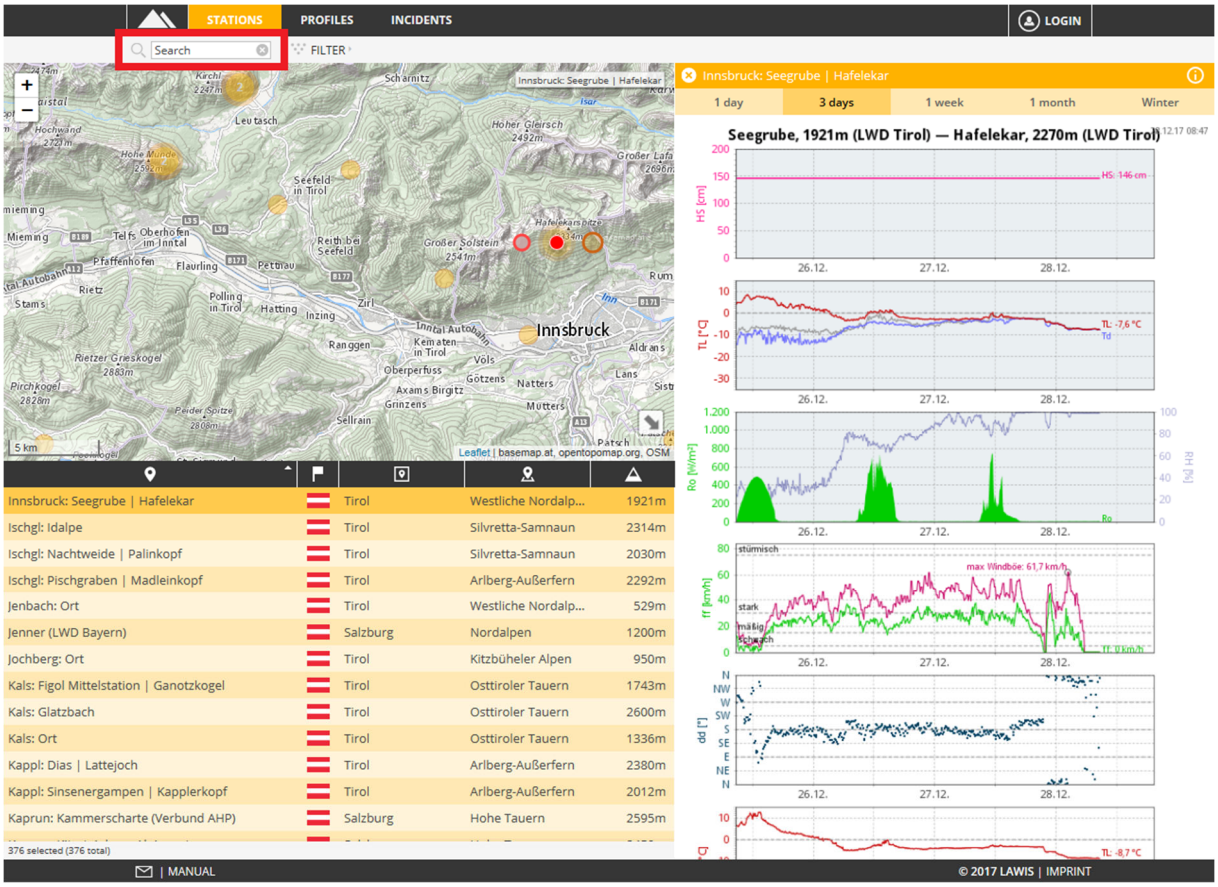
Your selection of the station you seek is made by clicking on it. The corresponding graphic information appears at the right next to map and list. The depiction displays the measured and/or calculated magnitudes with the time recorded. The prior 3 days are depicted here.



1.4. Locating stations with a search machine

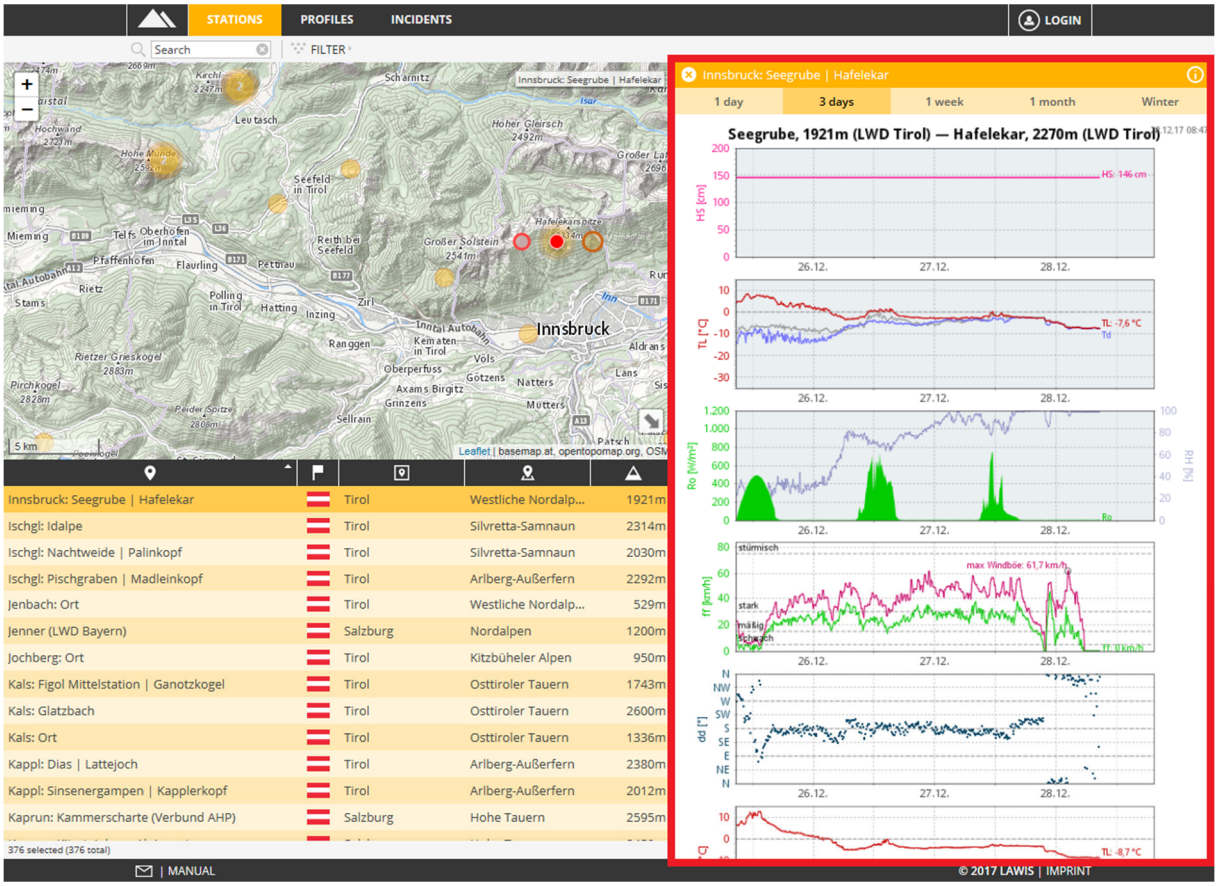
The Search space is at the upper left 

If name, region or subregion of the searched-for event are known, the appropriate search word can be entered here. LAWIS filters all results and displays the list of objects found beneath the graph. The filters are automatically adapted.



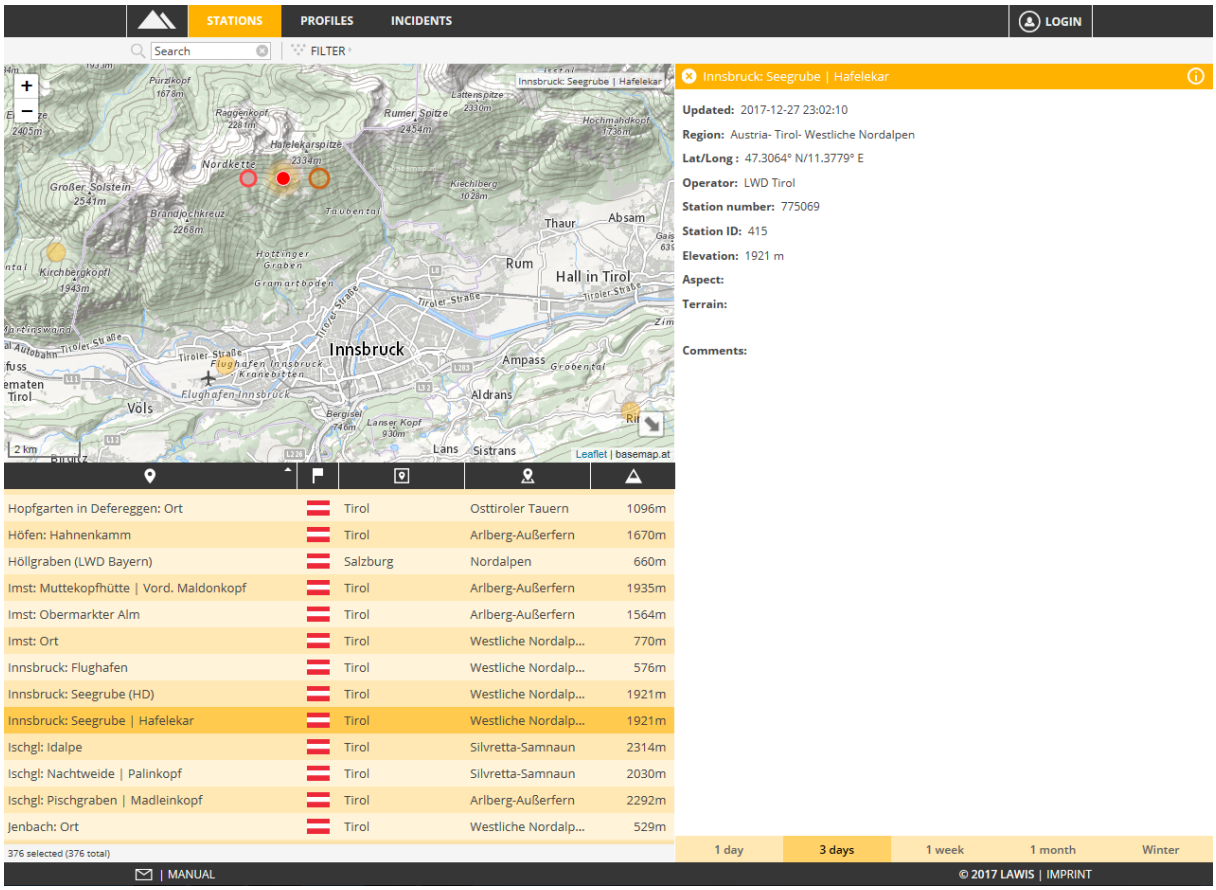
2. Selecting stations

Once the searched-for station is located by mans of map, filter, list or search, a graphic depiction of the automated measurement station opens on the right.

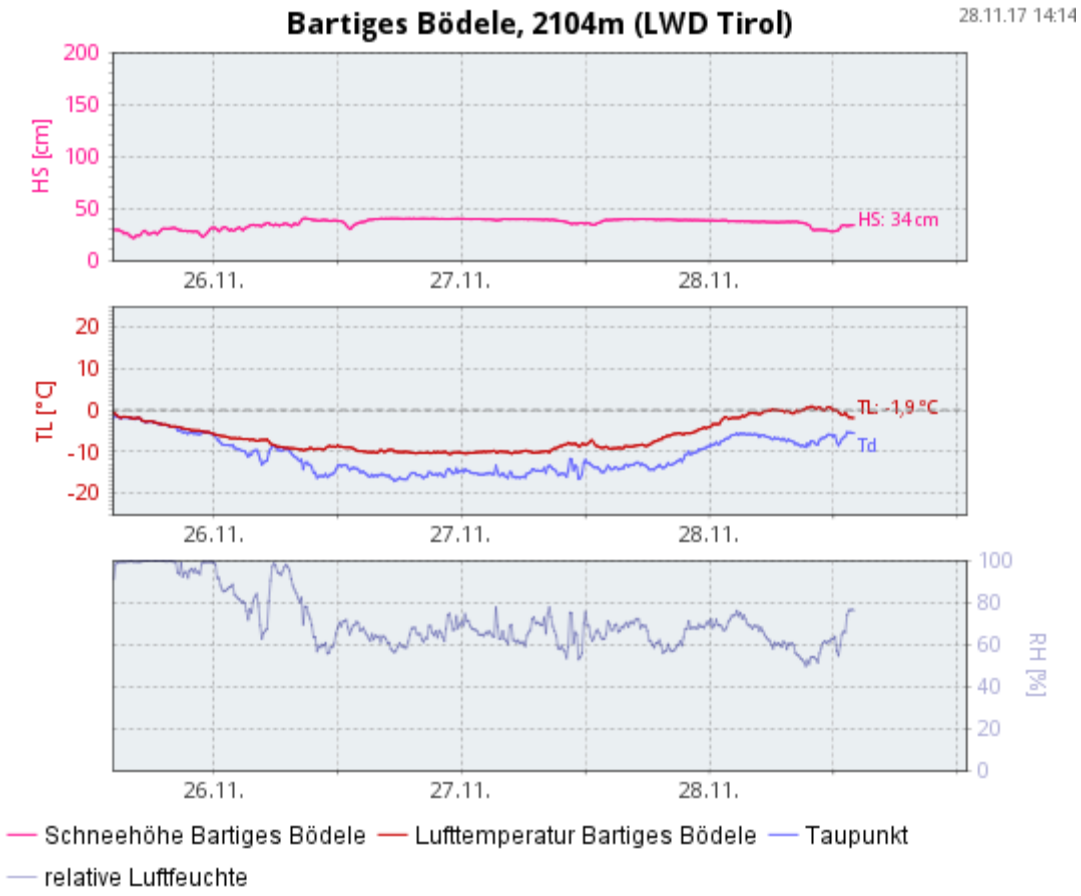


The following time windows can be selected in the orange space above the station depiction:

1day	0 to 24 hours
3days	0 to 72 hours
1week	0 to one week
1month	0 to one month
winter	0 to six months



With  in the upper left corner, the information about the station can be opened or closed . Clicking  or one of the time windows 1 day | 3 days | 1 week | 1 month | Winter at the lower rim, takes you back to the graphic depiction..



By clicking on the graph, a new tab is opened in which the view of the graph is enlarged.

Name and altitude of the Station are found above the graph. **The Legend** beneath the graph displays a measurement from a station to each symbol. Besides that, each event is assigned a time scale along the y-axis and a corresonding label of the measurement of magnitude measured.

3. Recorded magnitudes

Since not every automated weather station has the selfsame measuring instruments, data sometimes get measured at some stations and not at others. In the following depiction you can find the individual parameters of our stations, including abbreviations:

Name		code	Unit	
Schneehöhe	Snow depth	HS	cm	measured
Niederschlag	Precipitation	N	mm	measured
Lufttemperatur	Air temperature	TL	°C	measured
Taupunkttemperatur	Melting point temperature	Td	°C	calculated
Oberflächentemperatur	Surface temperature		°C	measured
Globalstrahlung	Global radiation	Ro	W/m²	measured
Windstärke	Wind strength	ff	Km/h	measured
Windrichtung	Wind direction	dd	°	measured
Relative Feuchte	Relative humidity	RH	%	measured

3.1. Interpretation of recorded magnitudes

Please note that the graphs depict raw data.

Snow depth: Depth of the deposited snow from the ground. Ground = zero is the starting basis, this was calibrated at a time when there was no snow cover.

Precipitation: A summation is depicted from 06:00 UTC for 24 hours. Then the sum is set back to zero at 6:00 UTC and begun anew.

Air temperature: Air temperature in the shade, i.e. without influence of solar radiation.

Condensation temp: The temperature at which condensation occurs, in other words, the temperature at which water contained in the atmosphere as a gas transforms to liquid state. Condensed water occurs visibly in the form of clouds, fog, mist, etc. ATTENTION: the condensation temperature is not higher than the air temperature. If both are equal, a state of saturation (RH=100) occurs before actual condensation takes place.

Surface temperature: Temperature at the surface of the snowpack, measured with infra-red.

Global radiation: Short-wave solar radiation coming from above. Ru is the reflected short-wave radiation coming from “below.”

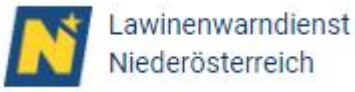
Wind strength: Wind velocity, measured every 10 minutes.

Maximum gusts: Maximum wind velocity measured over a few seconds.

Wind direction: Measured in degrees, in accordance with the ordinary directions of the compass.

Relative humidity: A measure of the water contained in the atmosphere in gaseous form. At 100% a state of saturation occurs. Gaseous water condenses to form liquid water in the air, appearing to the human eye as fog, clouds, etc.

4. Impressum – Partner



LAWIS - Lawinenwarndienst Informationssystem
Created in collaboration with the Avalanche Warning Services of Tirol, Styria, Salzburg, Upper Austria, Vorarlberg, Carinthia, Lower Austria, together with the University of Vienna, Institute for Geography and Regional Research.