



Data Hackdays BE 2025

Permafrost

Hacker:innen: Pavel Pozdnyakov Bedag, Wito Traub, Patrick Bärtschi Tribecraft, Jean-Marie Heck Tribecraft, Mizgin Sido GS-GSI
Challenged Owner: Adrian Peter Amt für Wald und Naturgefahren, Marco Engeler Amt für Geoinformation



Plan 0

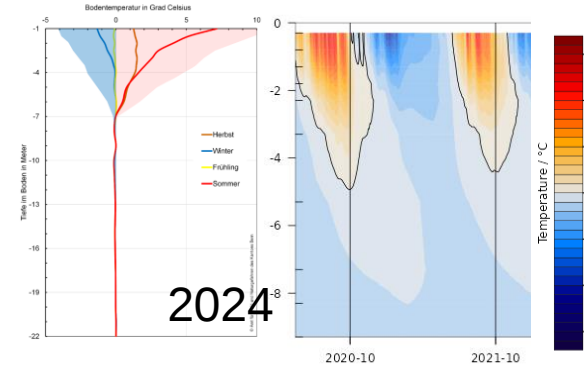
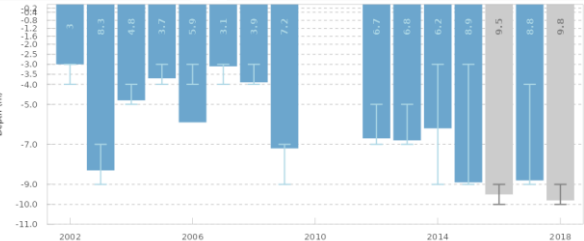
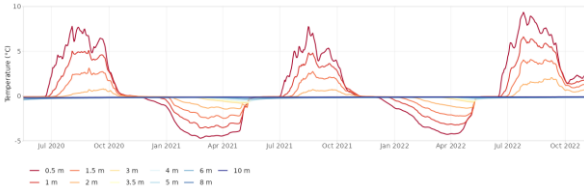
Rohdaten in CSV

A	B	C	N	O	X	Y	AD	AE	AF	AG	AH	AI	AJ
Datumzeit	ALBH01	ALBH02	BIRG01	BIRG04	CHIF02	CHIF03	CSNE01	CSNE02	CSNE03	CSNE04	CSNE05	DOLS01	DOLS02
2017-07-11 19:00:00 UTC	8.402295	6.860596	9.626007	9.322754								7.753693	10.03356
2017-07-11 20:00:00 UTC	7.986389	6.716217	9.453339	9.279785		7.318	3.248		-0.171			7.523865	9.541199
2017-07-11 21:00:00 UTC	7.151062	6.346344	9.088226	9.088853	6.509							7.108154	9.196838
2017-07-11 22:00:00 UTC	6.469971	6.141724	8.831879	8.851898				2.477		2.182		6.818695	8.747986
2017-07-11 23:00:00 UTC	5.897139	5.896973	8.445463	8.617309		5.231			-0.171			6.448395	8.323669
2017-07-12 00:00:00 UTC	5.795593	5.833907	8.32234	8.469482	5.179		2.37	1.561			2.744	6.263977	8.028442
2017-07-12 01:00:00 UTC	5.551941	5.653046	8.111572	8.279175								6.141327	7.77652
2017-07-12 02:00:00 UTC	5.551941	5.612457	8.027405	8.152649	4.298	2.101			-0.171	2.262		5.957733	7.567852
2017-07-12 03:00:00 UTC	5.775238	5.653046	7.964325	8.098478	4.999							5.978088	7.463013
2017-07-12 04:00:00 UTC	5.714264	5.653046	7.964325	7.984344								5.937347	7.338043
2017-07-12 05:00:00 UTC	6.593292	7.503845	7.754608	7.900391								5.835602	7.213348
2017-07-12 06:00:00 UTC	11.81219	8.198862	7.567941	7.993563	7.041		2.823	1.751		2.503	2.877	5.835602	7.151062
2017-07-12 07:00:00 UTC	14.02609	7.524719	7.754608	7.690918								5.557733	7.400513
2017-07-12 08:00:00 UTC	14.50092	7.566467	7.712738	7.712758		6.433	5.102		-0.171			5.978088	8.19696
2017-07-12 09:00:00 UTC	13.18369	7.754608	7.483002	7.542352	12.944							6.386871	8.833221
2017-07-12 10:00:00 UTC	11.97625	7.712778	7.738673	8.003171						6.484		6.521936	10.14902
2017-07-12 11:00:00 UTC	12.33337	8.046178	8.467104	8.047424		8.99			-0.171			7.560513	11.78967
2017-07-12 12:00:00 UTC	12.24234	8.301392	9.755829	8.173737	12.122		7.041	4.74			7.066	7.215881	12.67627
2017-07-12 13:00:00 UTC	11.99286	8.470642	9.820862	8.681841								8.409975	12.72217
2017-07-12 14:00:00 UTC	11.49762	8.767975	10.30581	9.088853								9.430298	14.40555
2017-07-12 15:00:00 UTC	11.69962	8.810577	11.47284	9.430298	11.807	10.198	6.23		-0.171	4.818		10.36935	14.57257
2017-07-12 16:00:00 UTC	11.05161	8.831879	12.17145	9.884277								10.64941	14.35794
2017-07-12 17:00:00 UTC	10.41159	8.59787	11.54001	10.16721		9.731			-0.171			10.49551	13.57959
2017-07-12 18:00:00 UTC	9.990299	7.964325	11.22736	10.23085	8.693		4.402	3.354		3.67	4.298	10.2327	12.76813
2017-07-12 19:00:00 UTC	8.408295	7.378845	10.62939	10.01468								9.862579	11.6322
2017-07-12 20:00:00 UTC	7.671844	6.695618	9.799164	9.754181		7.242	3.512		-0.171			9.451813	10.54337
2017-07-12 21:00:00 UTC	7.213348	6.407867	9.302734	9.451813	6.839							9.108246	9.196838

Portal for ArcGIS



Interaktive Plots





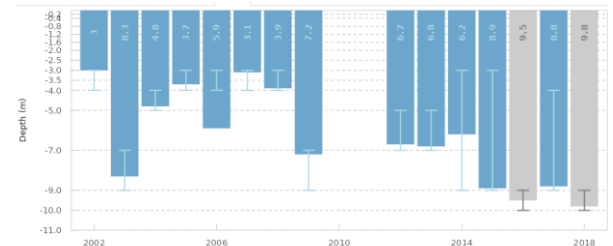
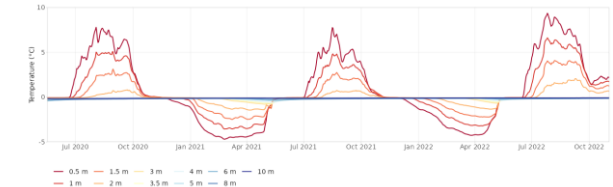
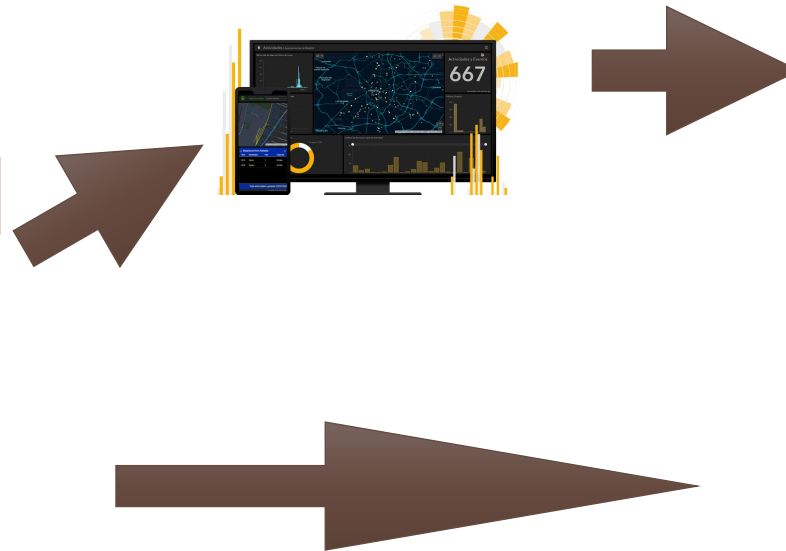
Plan 1

Portal for ArcGIS

Interaktive Plots

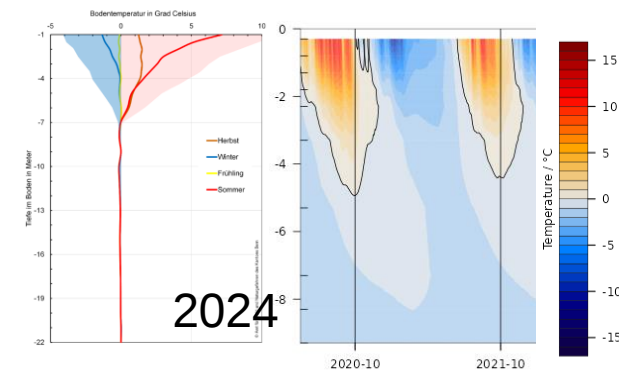
Rohdaten in CSV

CSV enriched



Python (Pandas)

Python Matplotlib



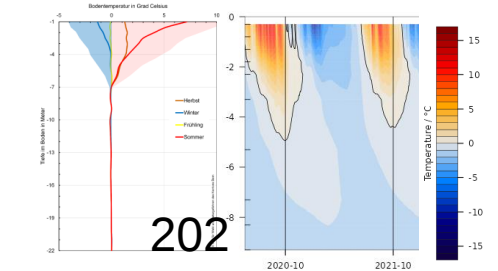
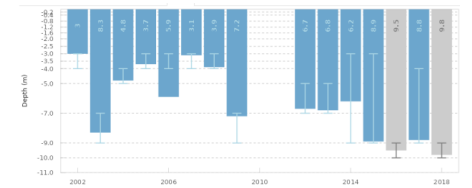
CSV enriched



Python (Pandas)

- * mit Gen AI
- * via Dash Gui
- * via Skript

- * ArcGIS
- * other (Flask, ...)



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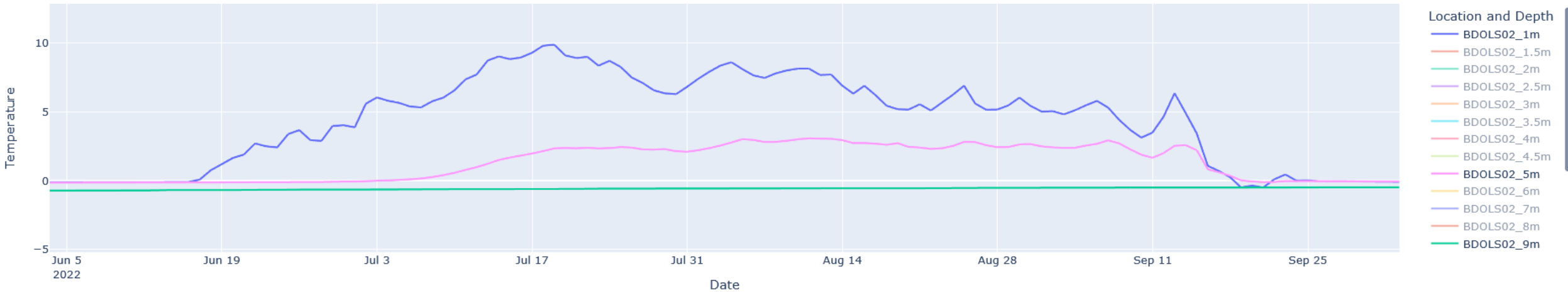


Dashboard 1

BDOLS02

Daily

Temperature over Years for BDOLS02 (Daily)



Export Plot to HTML



Dashboard 1

M_BDOLS

Yearly

Temperature over Years for M_BDOLS (Yearly)



Export Plot to HTML



Dashboard 2

Permafrost Temperature Analysis Dashboard

Interactive analysis of permafrost temperature measurements

Visualization Navigation

Click on the buttons below to view different visualizations:

[Time Series Plot](#)[Seasonal Patterns](#)[Yearly Trends](#)[Freezing Days Analysis](#)[Freeze/Thaw Cycles](#)[Temperature Distribution](#)[Correlation Heatmap](#)

Analysis Description

This dashboard presents various analyses of permafrost temperature data:

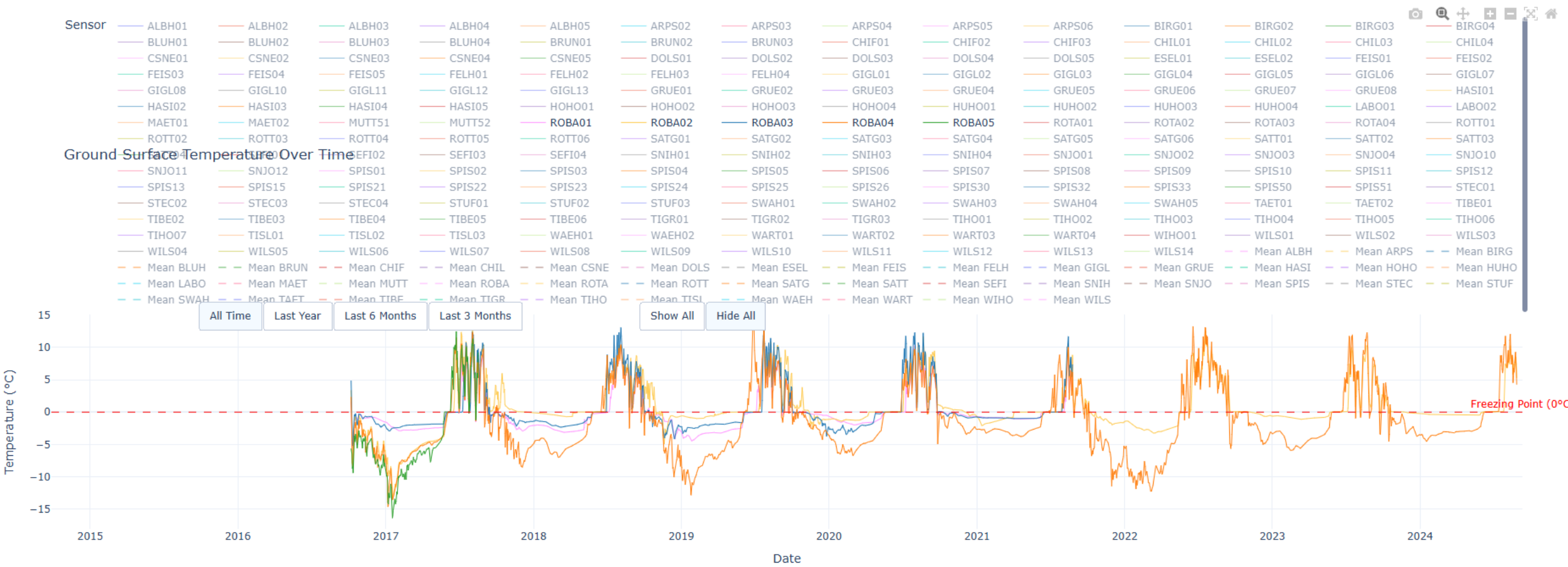
- **Time Series Plot:** Shows the temperature variation over time for all sensors.
- **Seasonal Patterns:** Displays monthly temperature patterns across different years.
- **Yearly Trends:** Displays average yearly temperatures with trend lines.
- **Freezing Days:** Shows the number and percentage of days below freezing for each year.
- **Freeze/Thaw Cycles:** Counts how many times the temperature crosses the freezing point each year.
- **Temperature Distribution:** Histogram of temperature values for each sensor.
- **Correlation Heatmap:** Shows how closely different sensors' measurements correlate with each other.

Tip: All visualizations include "Hide All" and "Show All" buttons that allow you to hide all data traces and then selectively show only the sensors you're interested in.

Note about M_ columns: Columns starting with "M_" (shown as "Mean" in the visualizations) represent the mean values of all measurement points at a specific location.



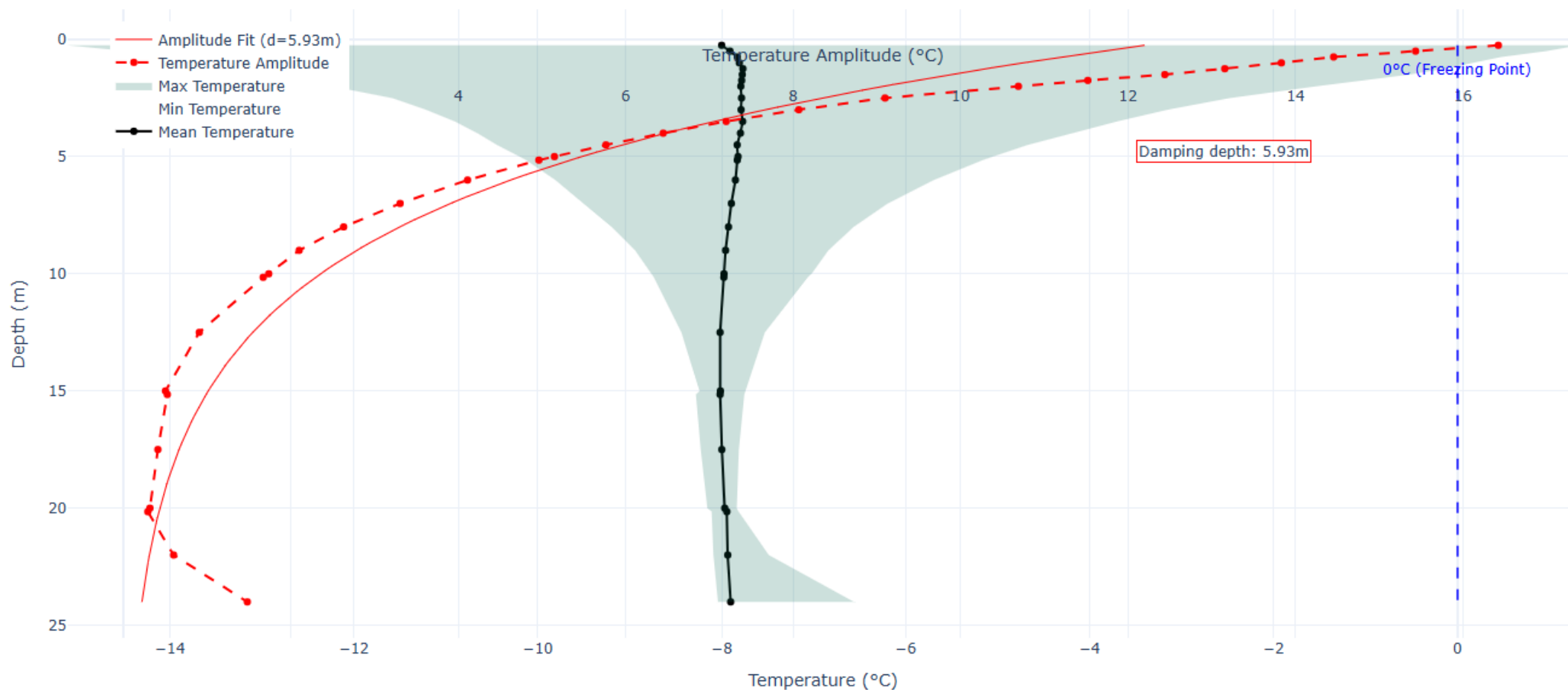
Dashboard 2





Dashboard 2

Temperature Range with Depth: BJUNG01





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Thomas Krüttli

„All about COM“ bei Bedag Informatik AG

Passion, Power und der richtige Fokus - Das sind die Data Hackdays BE ... mehr



Nr.	Anforderung
1	Jahresbudget auf Basis von Applikations...
2	Tagesmittelwerte
3	Monatsmittelwerte
4	pro Standort

1. CSV
2. CSV

18. April 2019
19. April 2019