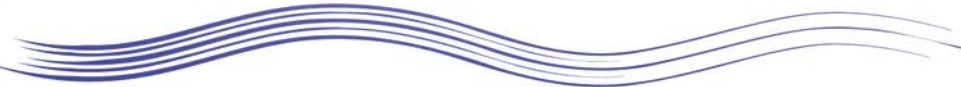


GNSS Reflectometry for Tidal Datums

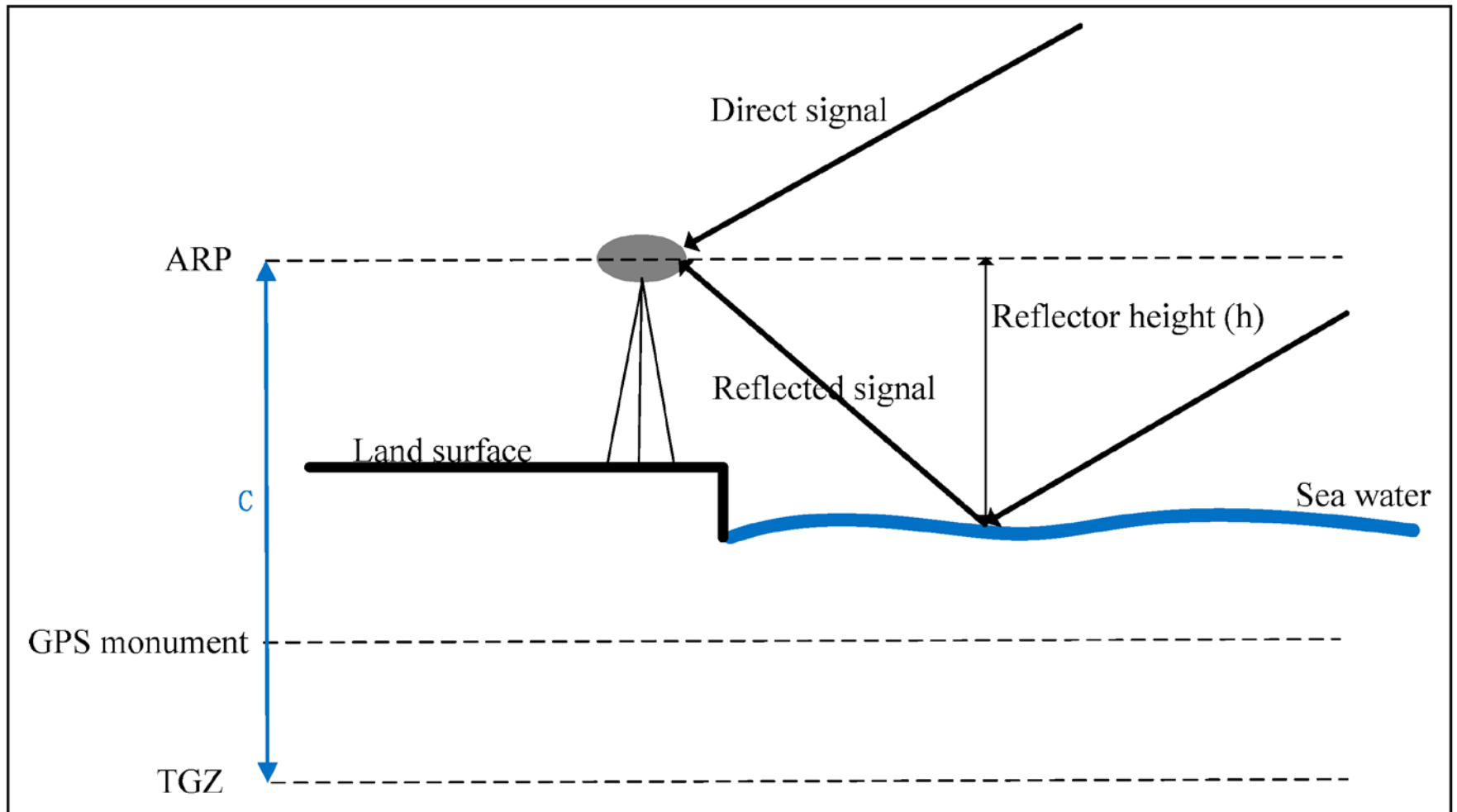
Erik Oppegard
April 29, 2020



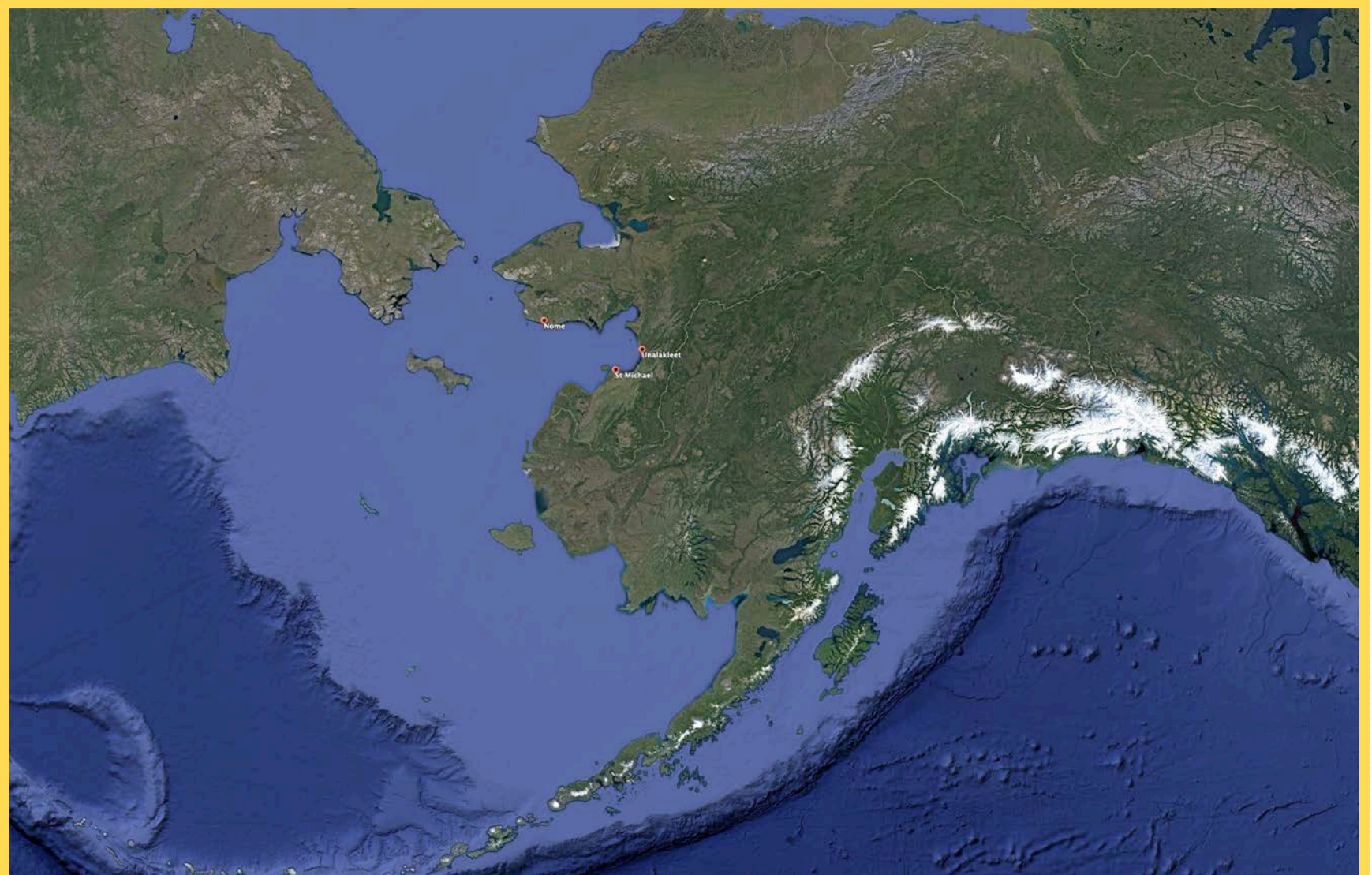
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SURVEYING GPS TIDES HYDROGRAPHY



From mdpi.com



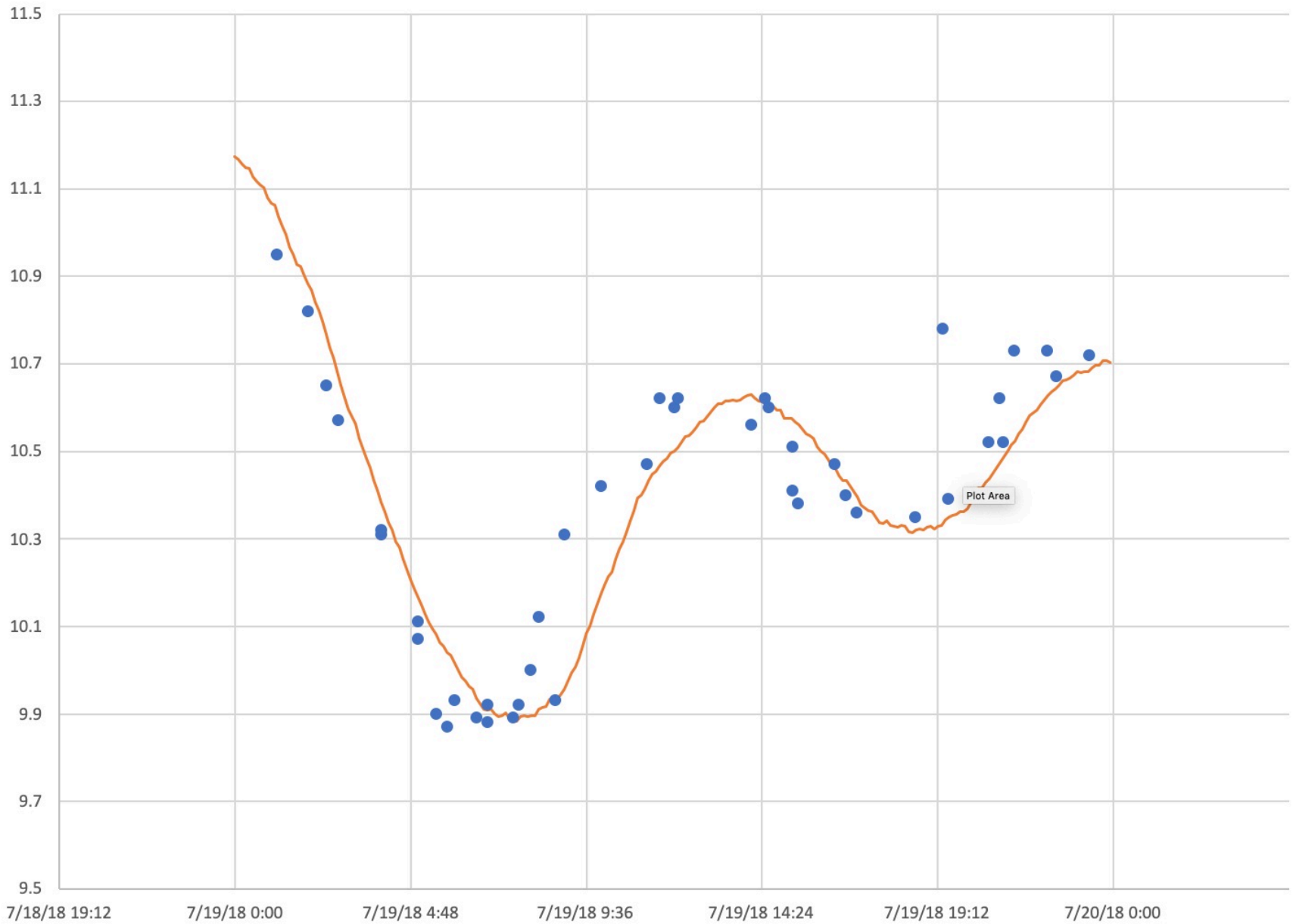
GNSS Reflectometry at St Michael, AK



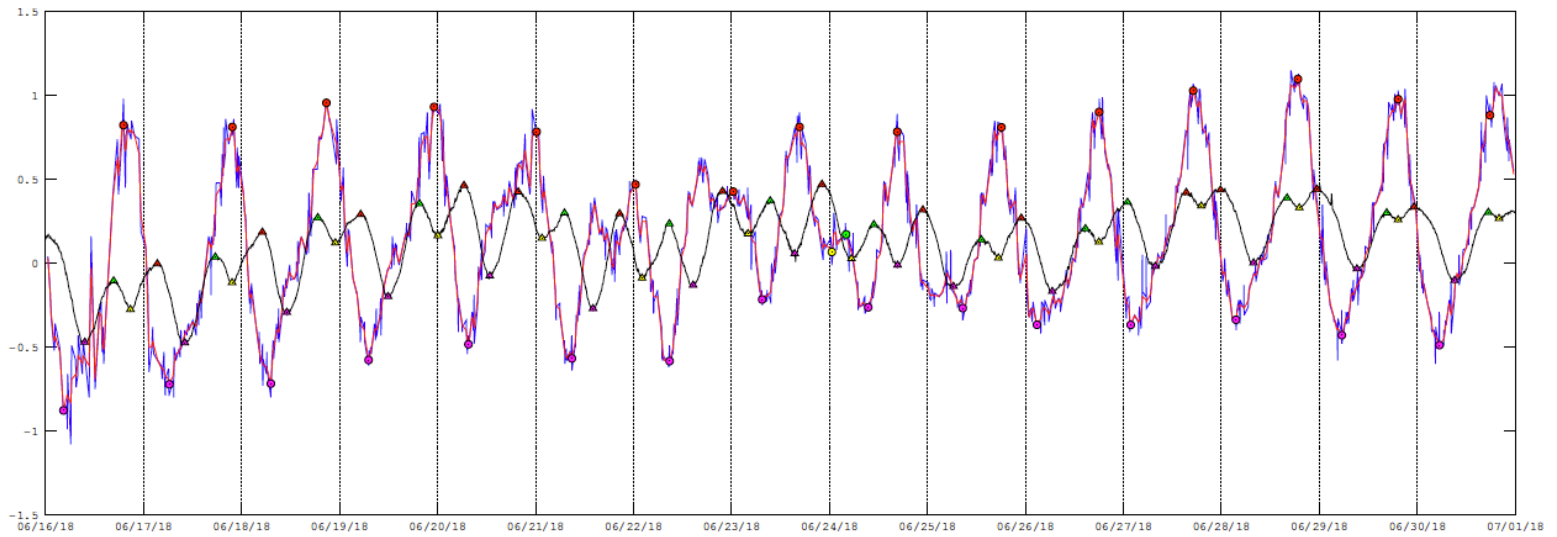
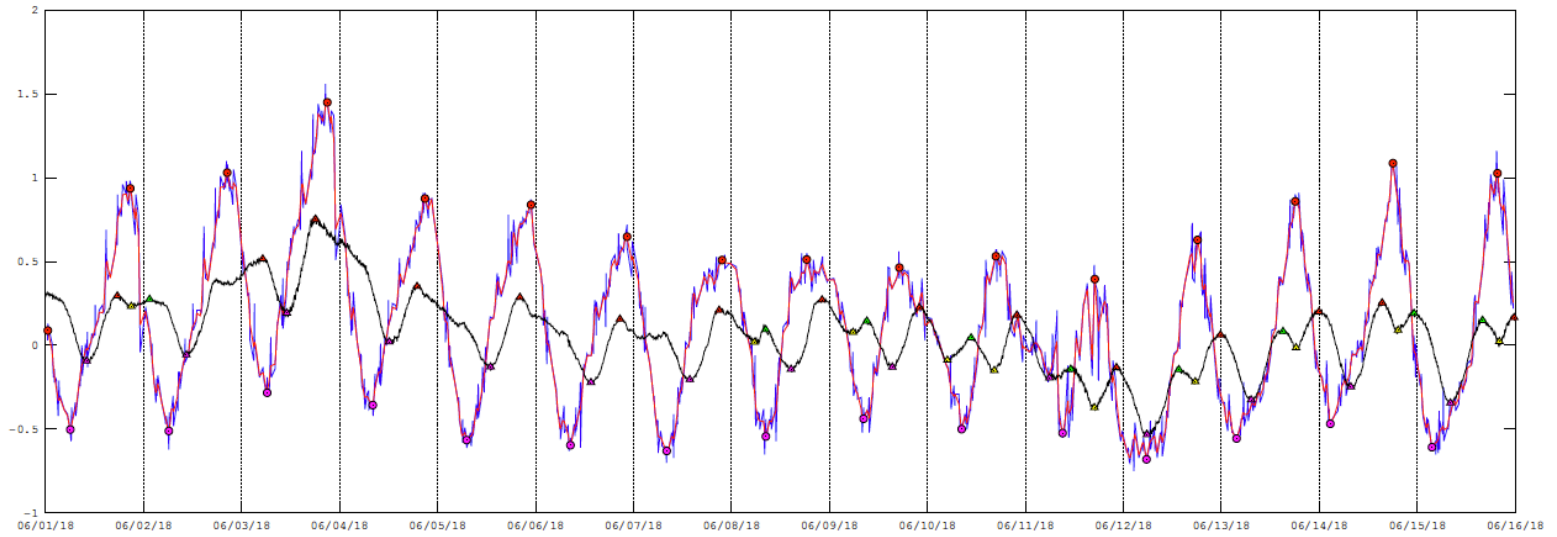
GNSS Reflectometry at St Michael, AK



St Michael AT01 GNSSR vs Unalakleet (orange)



st_michael_shifted_navd88_20200220140257.csv: Jun 2018

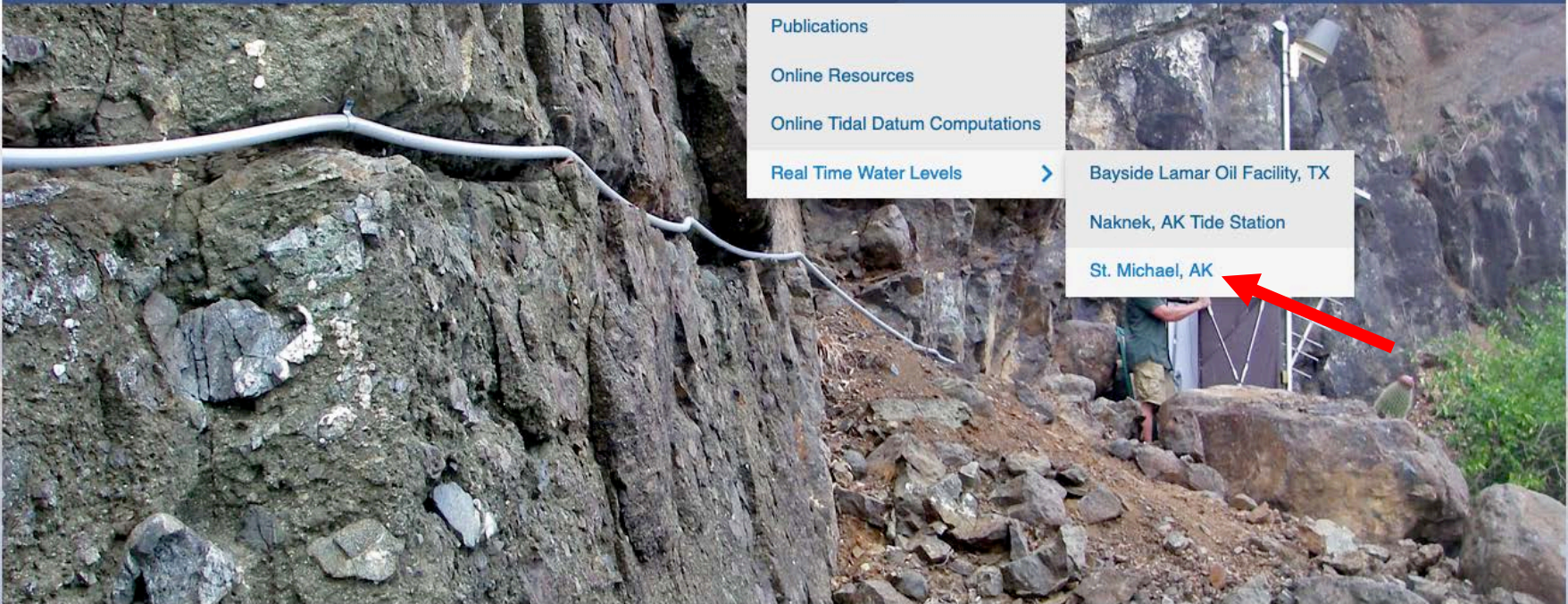




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At the boundary between land and sea

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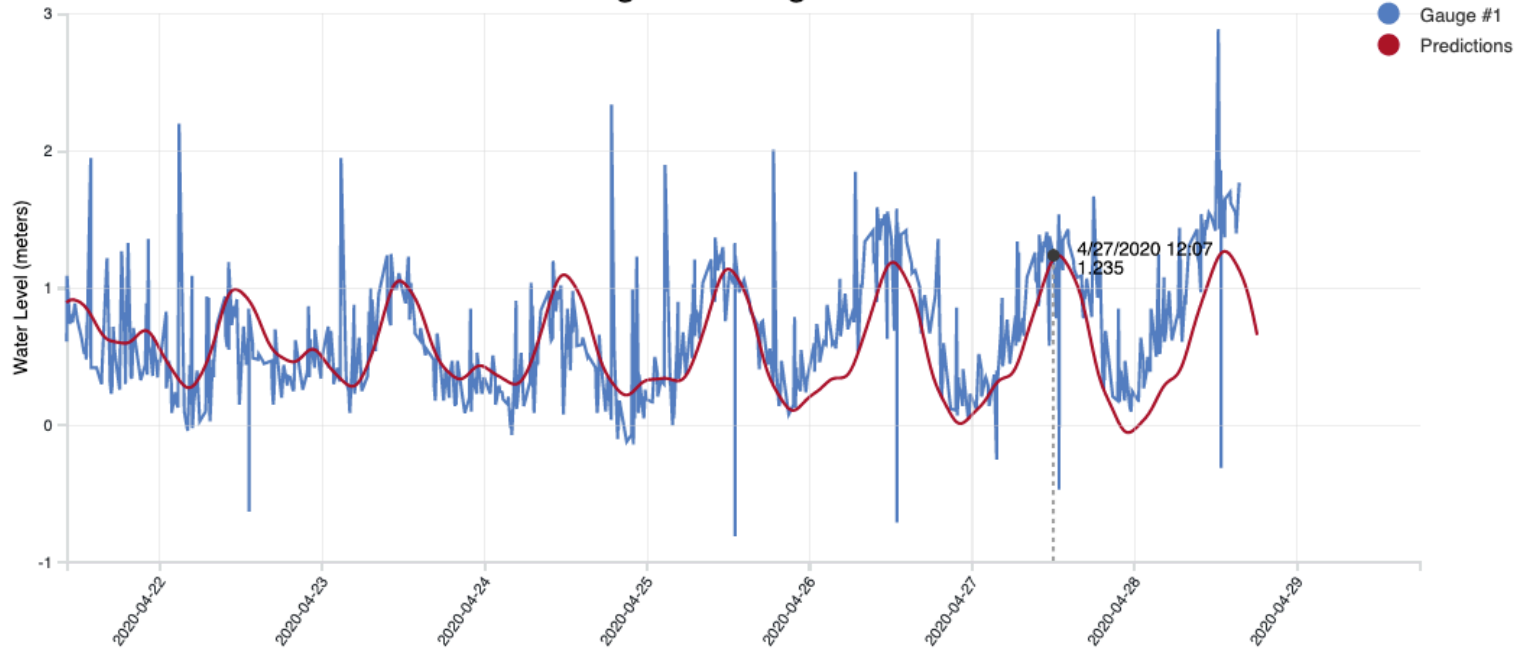
JOA Surveys, LLC (JOA), is an Alaska based surveying company specializing in tides and water level measurement, vertical datums and geodetic networks. Since 2003, we have supported shoreline mapping, hydrographic surveys, bathymetric lidar surveys, and special datum determination projects in the Gulf of Maine, Massachusetts, Chesapeake Bay, Florida Keys, Puerto Rico and the Virgin Islands, the Gulf of Mexico, California, Oregon, the Inside Passage of Alaska, the Gulf of Alaska, the Aleutian Islands, Bristol Bay, Kuskokwim River and Bay, Bering Sea, Norton Sound, the Chukchi Sea and the Beaufort Sea.

JOA is a partnership of Erik Oppedard, Nathan Wardwell, and Mike Zieserl. We are always looking for interesting and challenging projects along the coast of Alaska and beyond.



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Current Gauge Readings for St. Michael



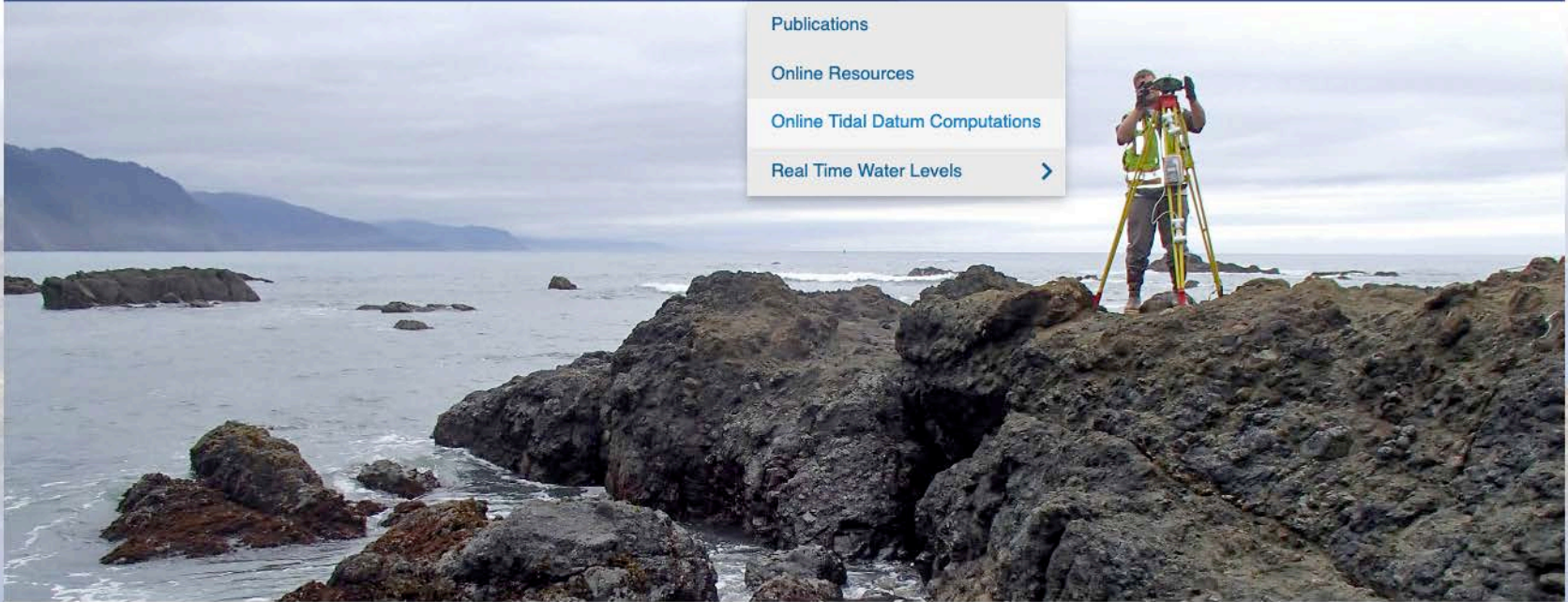
All observation times are local to your browser's settings



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JOA Tidal Datum Tool



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Registration Page

Convert your data to information. Upload water level measurements and get tidal datums referenced to the National Tidal Datum Epoch within minutes.

First Name:

Last Name:

Organization:

Phone:

Email:

Password:

Confirm:

I'm not a robot 

[Get Started](#)

Already registered? [Sign In here.](#)

Online Tidal Datum Computations

Explanation

JOA Surveys has completely automated the tidal datum computation process. Water level enthusiasts no longer need to immerse themselves in tidal datum computation methodology. Instead this tool allows a user to focus their effort on data interpretation.

The only required inputs are a comma delimited file and the users email address. The input water level data can be sampled at any interval from 1 second to 60 minutes. The data must span at least 24 hours. The resulting tidal datums are referenced to the current National Tidal Datum Epoch, when applicable.

All of the computations are based on the methodology developed by the United States' water level and tidal datum authority NOAA's Center for Oceanographic Operational Products and Services. The tool does not derive prediction based datums such as Lowest Astronomical Tide.

The results are dependent on the quality of the data being submitted, duration, and the applicability of the controlling station selected (if chosen).



Disclaimer

JOA Surveys, LLC does not guarantee availability, reliability, and performance of the Online Tidal Datum Computation Tool and accepts no legal liability arising from, or connected to, the use of information on this website or use of this service. JOA reserves the right to view any information contained in the uploaded file.

JOA Tidal Datum Tool



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File to Process:[†] No file selected.

*Note: files must be uncompressed. *.zip* or *.gz* files will not process.
Only CSV files will process, with either *.txt* or *.csv* extensions*

Control Station ID Number:

[View Stations on NOAA.gov](#) (new window)

Note: If a control station ID is not provided the datum will be computed using the First Reduction Method

Latitude:

Longitude:

*Latitude and longitude should be entered as decimal degrees
(ex. Lat = 61.23766, Lon = -149.89019).*

Processed By:

erik oppegard

Email:

erik@joasurveys.com

NOTE: Fields with **bold names** are required.

[†] Files must be plain text with a non-data header row.

Data itself should be comma-separated in the following order:

- GMT Date/Time (mm/dd/yyyy HH:mm or mm/dd/yyyy HH:MM:SS)
- Water Level (METERS, up to three floating points)

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TIDE DATUM COMPUTATION REPORT

USER INFO

=====

USER: Kiva McCarthy
 PROCESS DATE: February 20, 2020
 PROCESS TIME: 14:05:48 LOCAL
 USER FILE: st_michael_shifted_navd88_20200220140257.csv
 FILE START: 2018/06/01 00:28:00
 FILE END: 2020/02/01 23:39:00
 ELAPSED TIME: 170.86 seconds

CONTROL STATION INFO

=====

STATION NUMBER: 9468756
 STATION NAME: Nome, Norton Sound, AK
 DATUM: STND
 TIME UNITS: GMT
 DATA UNITS: METRIC

FILTER PARAMETERS

=====

FILTER TYPE: BUTTERWORTH LOWPASS
 FILTER ORDER: 5
 CUTOFF FREQ: 19.67 cycles/day
 1-SIGMA: 0.064

COMPUTATION PARAMETERS

=====

DESIGNATION ALGORITHM: DIURNAL
 DATUM COMP METHOD: MMSC
 HIGHS COUNT: 630
 LOWS COUNT: 630

TIDAL DATUMS

=====

	HIGHEST	MHHW	MHW	DTL	MTL	MSL	MLW	MLLW	GT	MN	DHQ	DLQ	HWI	LWI	LOWEST
STANDARD:	10.998	9.094	9.045	8.453	8.446	8.397	7.846	7.813	1.281	1.200	0.049	0.033	NaN	NaN	5.871
MODIFIED:	10.998	9.077	9.045	8.455	8.446	8.397	7.846	7.833	1.244	1.200	0.031	0.013	NaN	NaN	5.871
DIRECT:	10.998	9.089	9.046	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.043	NaN	NaN	NaN	NaN

MONTHLY MEANS

=====

YEAR	MONTH	HIGHEST	MHHW	MHW	DTL	MTL	MSL	MLW	MLLW	GT	MN	DHQ	DLQ	HWI	LWI	LOWEST
2018	6	9.847	9.183	9.164	8.540	8.539	8.462	7.914	7.896	1.287	1.250	0.019	0.018	NaN	NaN	7.518
2018	7	9.684	9.310	9.310	8.681	8.681	8.720	8.052	8.052	1.258	1.258	0.000	0.000	NaN	NaN	7.706
2018	8	9.586	9.240	9.150	8.650	8.634	8.619	8.118	8.060	1.180	1.032	0.089	0.058	NaN	NaN	7.472
2018	9	9.583	9.114	9.096	8.583	8.580	8.615	8.064	8.052	1.062	1.032	0.018	0.012	NaN	NaN	6.875
2018	10	10.060	9.157	9.080	8.497	8.514	8.406	7.949	7.838	1.319	1.130	0.077	0.112	NaN	NaN	7.000
2018	11	10.453	9.208	9.164	8.529	8.543	8.373	7.922	7.850	1.358	1.243	0.043	0.072	NaN	NaN	6.387
2018	12	9.959	9.218	9.218	8.599	8.599	8.474	7.980	7.980	1.239	1.239	0.000	0.000	NaN	NaN	6.878
2019	1	9.871	9.336	9.248	8.716	8.706	8.576	8.165	8.096	1.240	1.083	0.089	0.069	NaN	NaN	7.044
2019	2	10.982	9.643	9.548	8.936	8.891	8.924	8.234	8.228	1.414	1.314	0.095	0.005	NaN	NaN	7.124
2019	3	10.227	9.185	9.101	8.542	8.517	8.507	7.933	7.899	1.287	1.167	0.085	0.035	NaN	NaN	6.805
2019	4	9.429	8.982	8.894	8.410	8.376	8.288	7.858	7.838	1.144	1.036	0.088	0.020	NaN	NaN	7.285
2019	5	9.453	9.013	8.980	8.443	8.441	8.395	7.902	7.873	1.139	1.078	0.033	0.029	NaN	NaN	7.438
2019	6	9.419	9.167	9.126	8.564	8.554	8.441	7.982	7.961	1.206	1.144	0.041	0.022	NaN	NaN	7.641
2019	7	10.156	9.378	9.312	8.722	8.709	8.556	8.105	8.066	1.311	1.207	0.066	0.039	NaN	NaN	7.611
2019	8	10.998	9.288	9.257	8.645	8.643	8.609	8.029	8.001	1.287	1.228	0.032	0.028	NaN	NaN	7.618
2019	9	9.977	9.265	9.199	8.674	8.671	8.793	8.144	8.083	1.182	1.055	0.066	0.061	NaN	NaN	7.239
2019	10	10.284	9.251	9.161	8.605	8.608	8.587	8.055	7.958	1.293	1.106	0.090	0.097	NaN	NaN	6.801
2019	11	10.831	9.015	8.919	8.269	8.256	8.077	7.594	7.522	1.493	1.324	0.097	0.072	NaN	NaN	5.871
2019	12	9.987	9.176	9.176	8.359	8.359	8.425	7.542	7.542	1.634	1.634	0.000	0.000	NaN	NaN	6.290
2020	1	10.169	9.217	9.217	8.440	8.440	8.450	7.664	7.664	1.553	1.553	0.000	0.000	NaN	NaN	6.143





Thanks!