

GIS2 Final Project

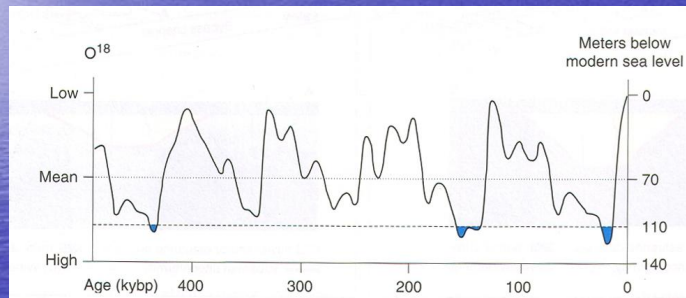
Effect of temporal sea level variations
on the formation of prehistoric Oregon
coast sand dunes

Leonard Powell
Ray Hennings

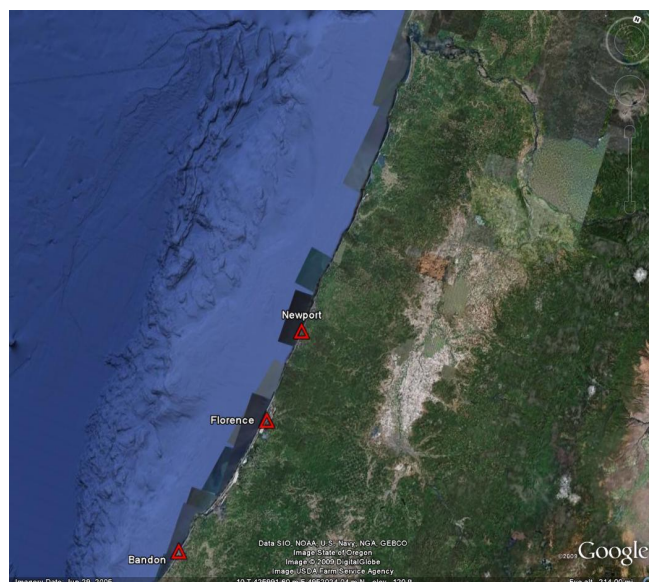
Overview

- Shoreline Recession Simulation
- Pleistocene shoreline width /dune depth correlation
- Arc Scene Visualization
- Conclusions / lessons learned

Sea Level Variations



Study Area



Google Earth Animation

- Modified KML sea level rise code
- Animation using time slider
- Limitations
 - Can't create movie with time animation
 - Limited to Google Earth imagery
- Animation

Correlation between Pleistocene shore width and Pleistocene dune depth

- Limited to sites with large number of data points
 - Florence
 - Newport
 - Bandon
- Analysis of:
 - sum of all Pleistocene layers
 - Pleistocene loess layers only

Correlation between Pleistocene shore width and Pleistocene dune depth

● Process

- Create Map in ArcMap with:
 - Bathymetry layer, georeferenced sampling points
- Use Near tool to determine distance to closest Pleistocene shoreline
 - Bathymetric data started at 200 meters
- Export table to Excel
 - Calculate correlation coefficient

Correlation between Pleistocene shore width and Pleistocene dune depth

The following tables represent the data shown in the four Excel screenshots:

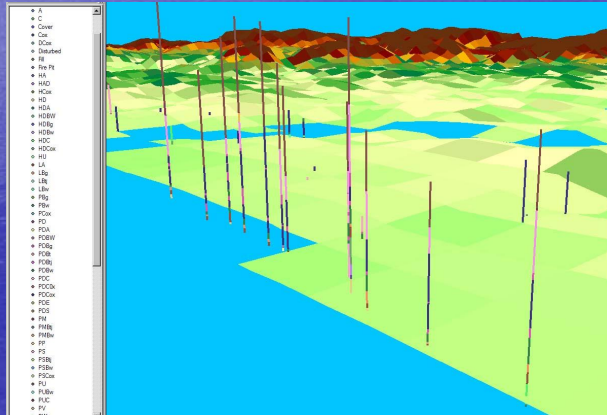
ID	UTM_N	UTM_E	Units	Top	Bottom	Thickness	Overall	NEAR_DIST	Correlation Coefficient
1	BAND1	4790980	388250	PDW	100	200	100	100	25144.36289
2	BAND2	4790730	388460	PV	192	282	90	90	25414.41373
3	BAND3	4790310	388250	PDW	65	150	85	85	25440.50827
4	BAND4	4788880	388153	PDW	50	350	300	300	25106.51563
5	BAND5	4788390	398730	PSC	150	450	300	300	28553.19138
6	BAND6	4786210	386510	PW	2779	2780	1	1	24839.14647
7	BAND7	4785770	399720	PDW	335	270	35	35	28942.86143
8	BAND8	4784790	388650	PDW	455	475	20	20	25064.50794
9	BAND9	4784640	388410	PW	1345	1346	1	1	25025.77572
10	BAND10	4783430	389180	PW	2340	2341	1	1	27434.97715
11	BAND11	4782940	389640	PDW	130	230	100	100	28922.43131

DUNE SHEET	UTM_N	UTM_E	Units	Top	Bottom	Thickness	NEAR_DIST	Correlation Coefficient
1	FLO1R4	488720	41040	PDW	140	160	20	4852.95116
2	FLO1R11	487280	40950	PDW	730	800	70	38310.22012
3	FLO1R21	486780	41050	PDW	5	35	30	37882.84672
4	FLO1R2b	486450	41390	PDW	60	70	10	40908.43336
5	FLO1R33	486230	40950	PDW	105	150	45	36660.93859
6	FLO1R34	486200	409430	PDW	60	70	20	38114.18838
7	FLO1R35	4862150	40940	PDW	5	60	55	36099.92935
8	FLO1R47	485620	409630	PDW	35	110	75	35996.96415
9	FLO1R60	485360	407810	PDW	5	25	20	33025.46634
10	FLO1R64	484560	407070	PDW	300	350	50	32044.11106
11	FLO1R66	484410	406080	PDW	275	310	35	31064.83224

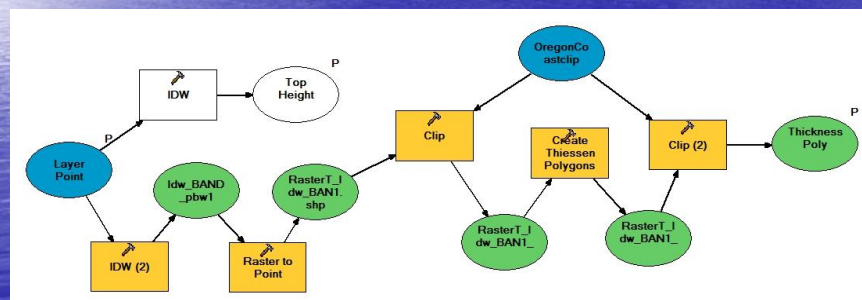
DUNE SHEET	UTM_N	UTM_E	Units	Top	Bottom	Thickness	NEAR_DIST	Correlation Coefficient
1	NEVP5	495540	41630	PDW	50	100	50	34520.24418
2	NEVP6	495540	417640	PDW	150	180	30	36086.49384
3	NEVP7	495520	416420	PDW	130	180	50	35862.19483
4	NEVP8	495490	416870	PDW	100	150	50	35506.78227
5	NEVP9	495470	416550	PDW	75	85	10	35338.49125
6	NEVP10	495450	417770	PDW	52	117	65	36514.73201
7	NEVP11	495370	416510	PDW	60	90	30	35860.81433
8	NEVP12	495340	416780	PDW	0	0	0	36230.18871
9	NEVP13	495290	416890	PDW	100	200	100	35588.98723
10	NEVP14	495260	416530	PDW	60	110	50	35117.88623

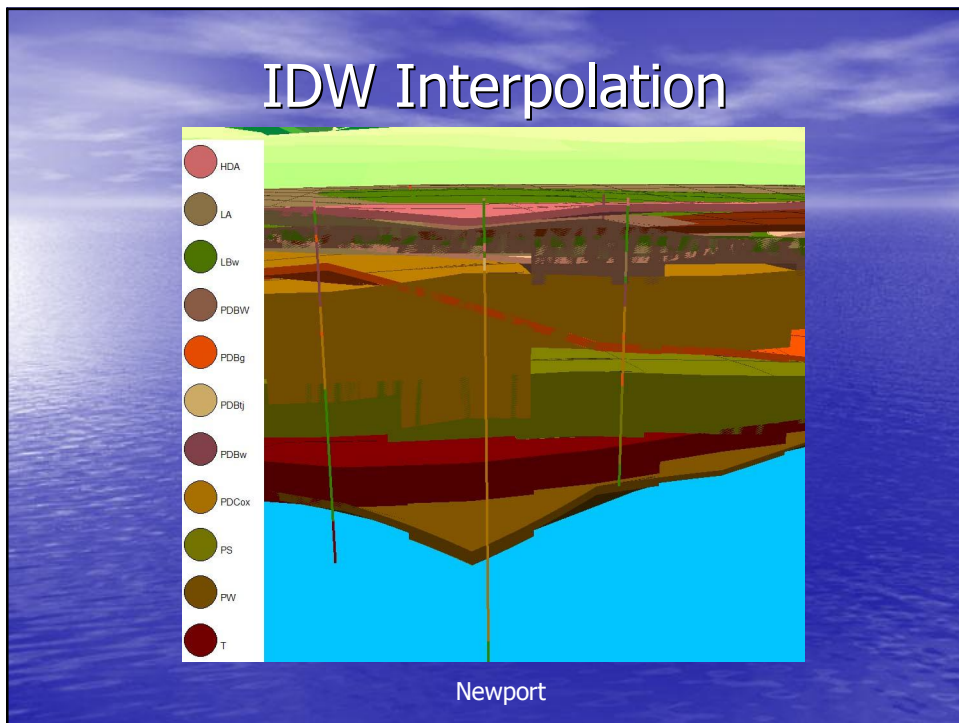
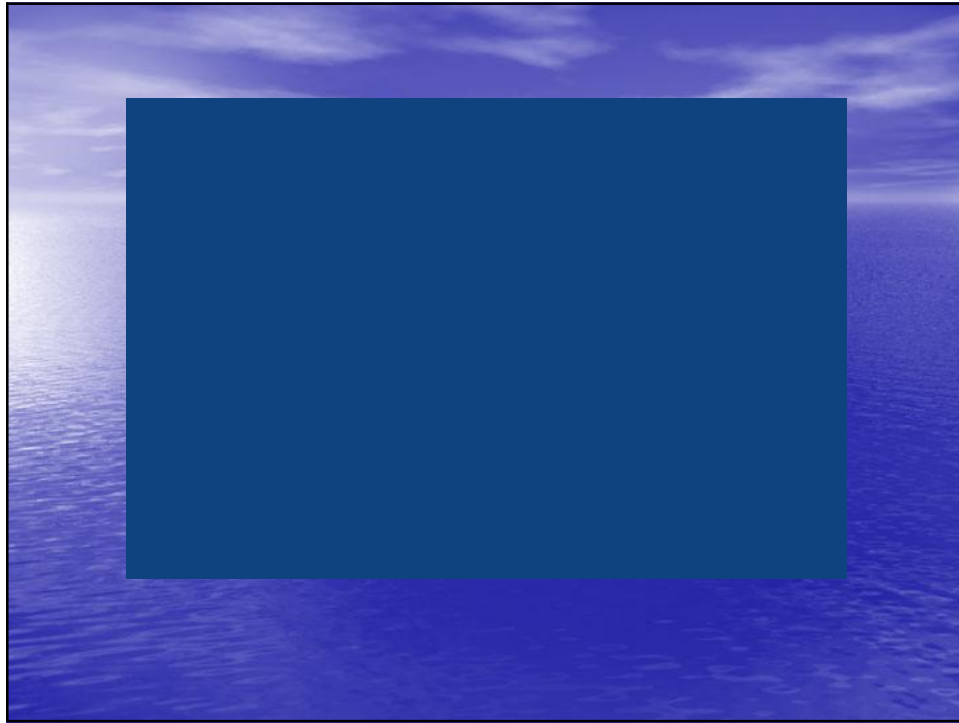
Arc Scene Visualization

- Visualize Dune Layers
 - Newport
 - Bandon



- Create layers from points
 - Inverse Distance Weighting: Top
 - Inverse Distance Weighting: Thickness
 - Convert Raster to Points then Points to Polygons





Conclusions / Lessons Learned

- Low correlation between Pleistocene shoreline width and dune depth
- Obtain expertise in phenomena being studied
- 3D tools can enhance understanding of processes and data