

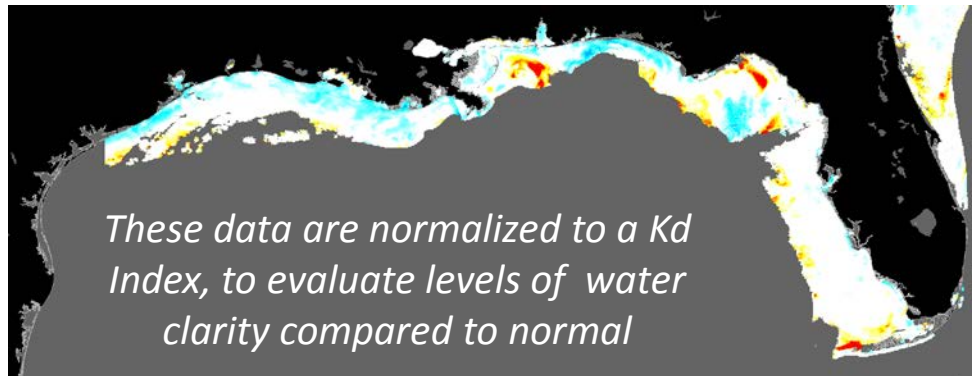
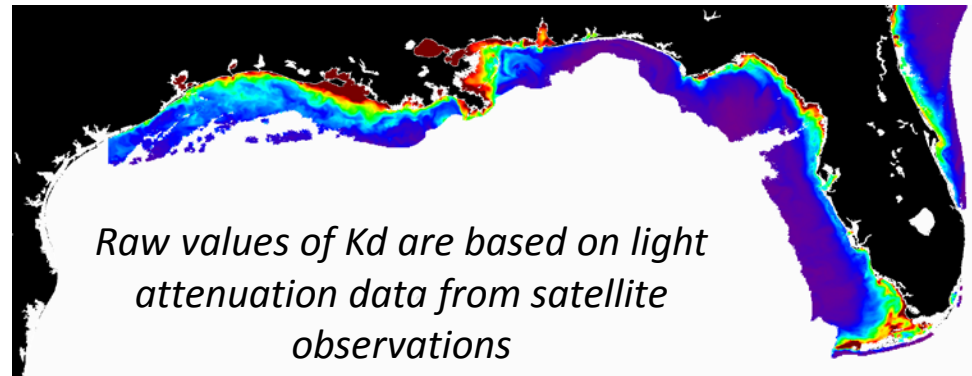
# Development of a Water Clarity Index for the Southeastern US as a Climate Indicator

Scott Sheridan, Kent State University, PI

Many coastal ecosystems are sensitive to changes in water clarity, but there is a current lack of ability to interpret it over broad spatio-temporal scales.

We therefore developed a new *Kd Index* of water clarity, established its connection to weather conditions, and recreated a time series back to 1948, decades before the earliest available satellite data.

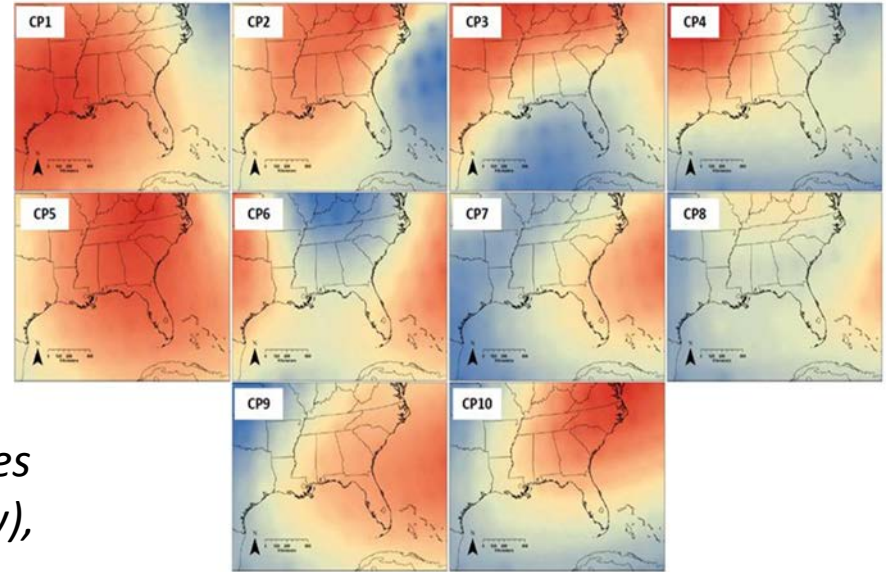
*Kd* is derived from SeaWiFS (1997-2010) and MODIS (2002-) ocean color data.



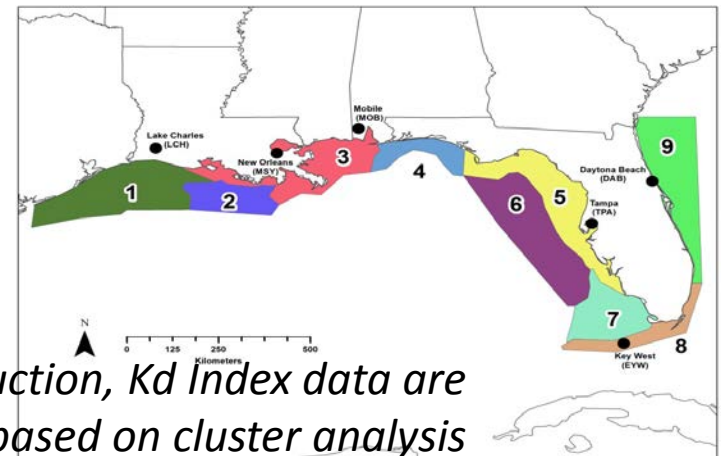
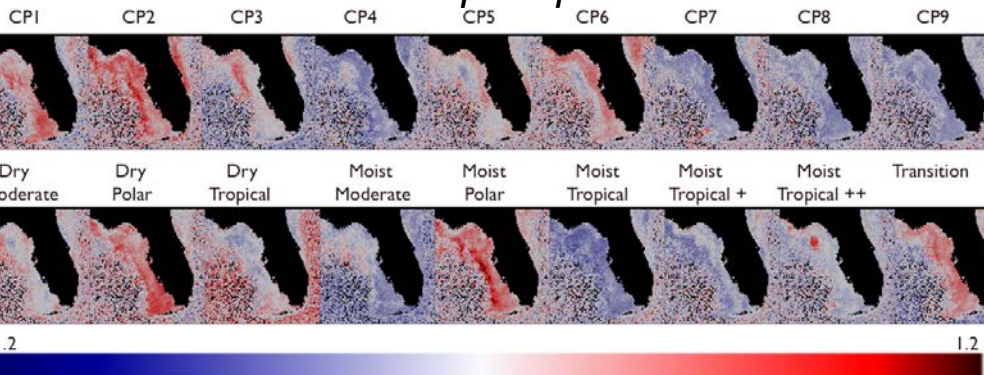
# Development of a Water Clarity Index for the Southeastern US as a Climate Indicator

Scott Sheridan, Kent State University, PI

*Synoptic climatological methods are used to assess holistic weather conditions across the region, including the development of circulation patterns (right) and surface weather types.*



*Kd Index anomalies correlate well with anomalies in circulation patterns and weather types (below), as well as precipitation*



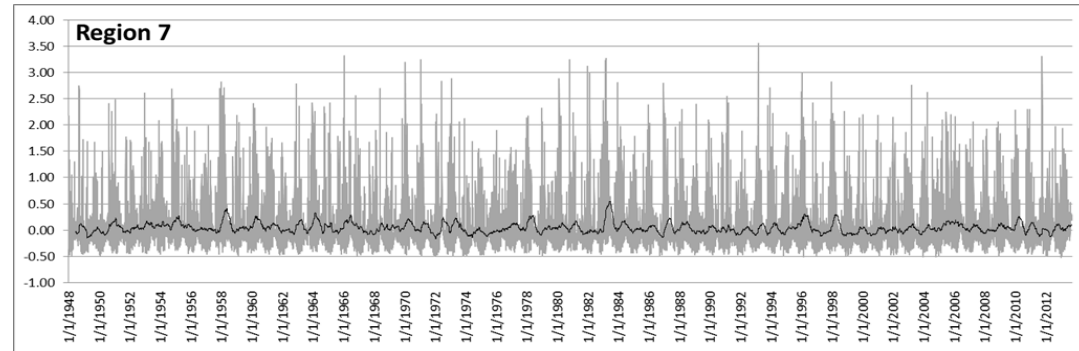
*For historical reconstruction, Kd Index data are aggregated into 9 regions based on cluster analysis*

# Development of a Water Clarity Index for the Southeastern US as a Climate Indicator

Scott Sheridan, Kent State University, PI

*The Nonlinear Autoregressive Model with External Input (NARX) is used to develop the relationship between weather patterns, rainfall, and Kd Index. Correlations below show higher ability in winter.*

*The NARX model is then used to reconstruct the historical time series from 1948-2013.*



		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
REGION	1	.58	.53	.51	.47	.36	.26	.28	.46	.52	.60	.63	.62
	2	.51	.48	.49	.40	.30	.16	.13	.27	.39	.50	.54	.53
	3	.46	.40	.37	.29	.23	.16	.17	.26	.36	.45	.49	.49
	4	.30	.35	.37	.33	.32	.31	.19	.10	.13	.33	.37	.34
	5	.76	.73	.69	.56	.41	.23	.25	.28	.44	.62	.72	.74
	6	.45	.45	.45	.40	.35	.29	.28	.18	.25	.42	.49	.50
	7	.67	.65	.65	.57	.43	.26	.29	.35	.47	.59	.68	.73
	8	.47	.44	.36	.34	.33	.30	.35	.39	.39	.42	.47	.47
	9	.43	.40	.41	.39	.40	.29	.28	.40	.40	.40	.38	.40

*In some regions, a clear upward trend in extreme Kd Index events (>90<sup>th</sup> %ile).*

