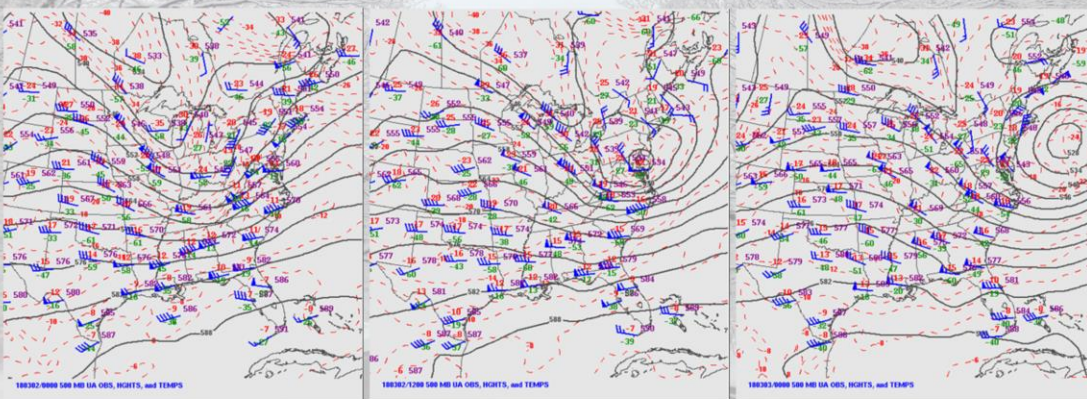
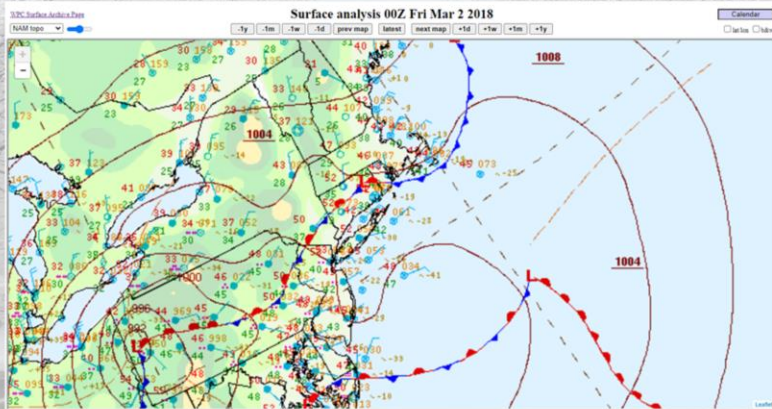


March 14, 2023 - Analogs



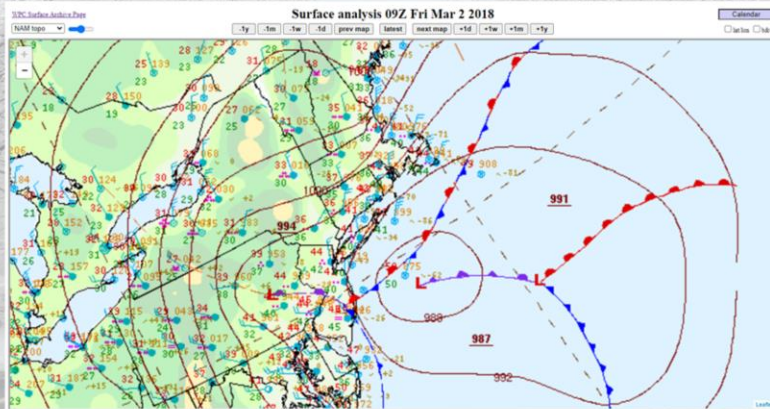
A similar case to the March 14, 2023 case occurred on March 2, 2018. The 500 mb flow pattern was quite similar; a deep, negatively tilted trough over the Great Lakes closed off over the northern mid-Atlantic, then moved out over the Atlantic Ocean.

Surface – 00 UTC 2 March 2018



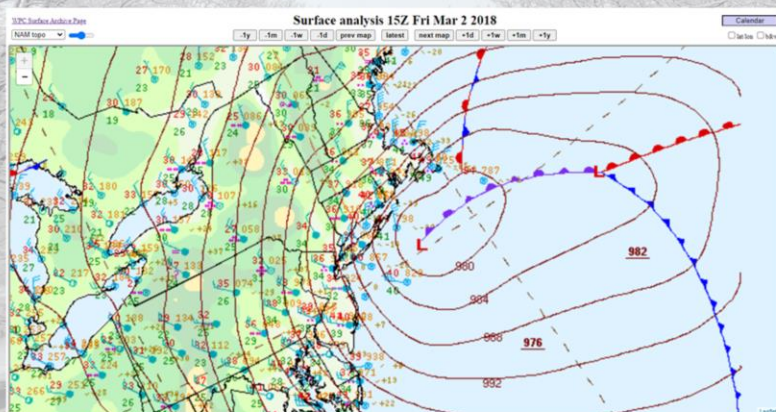
At the surface at 00 UTC on March 2, 2018, low pressure was initially located over western Pennsylvania, while secondary low pressure was forming off the east coast. This was a classic Miller B development scenario. The air mass in place across eastern New York at this time, prior to the onset of the storm, was not particularly cold, even to the north across southern Quebec. The web bulb temperature at Albany was above freezing, and barely below freezing over far northern New York.

Surface – 09 UTC 2 March 2018



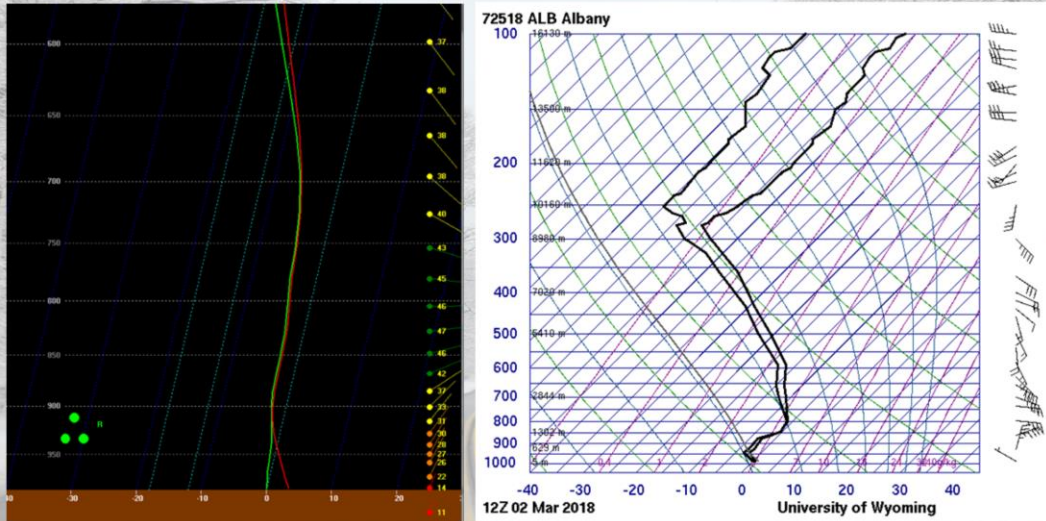
An elongated area of low pressure ultimately developed off the mid-Atlantic coast with two centers at 09z on March 2nd. One center was located well offshore, while a second center was located closer to the New Jersey coastline.

Surface – 15 UTC 2 March 2018



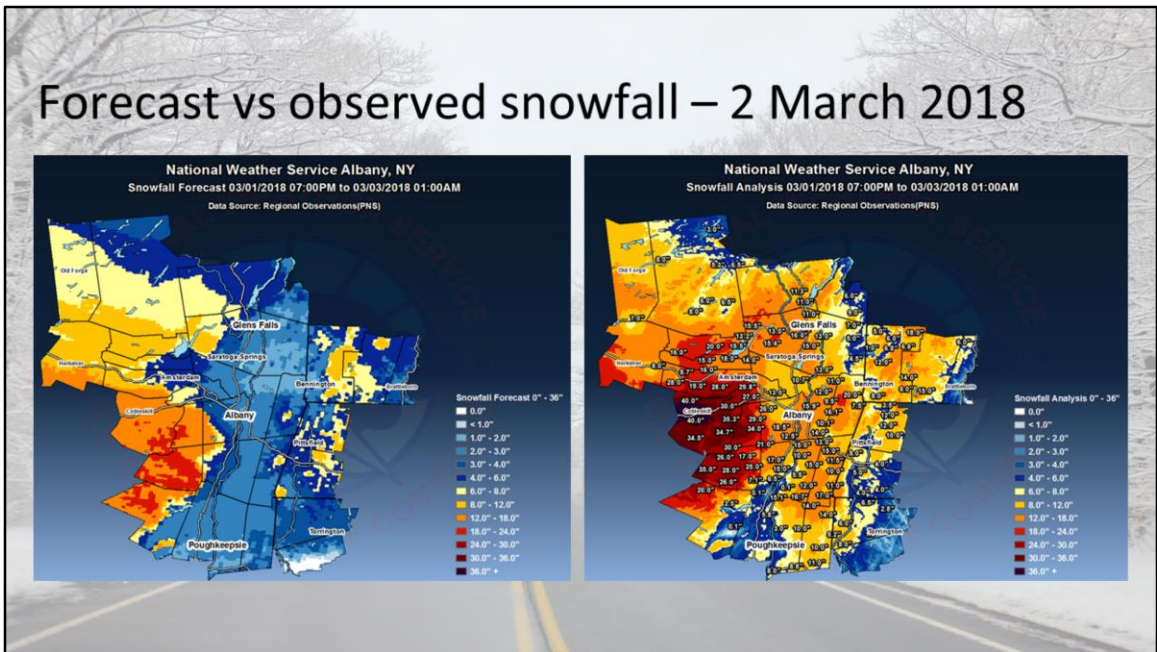
Elongated surface low pressure continued to deepen and move northeast off the east coast through 15 UTC on March 2, 2018. Once again, we can see a double barrel structure with one surface low well offshore, while another surface low is much closer to the coastline.

GFS vs observed sounding at ALB



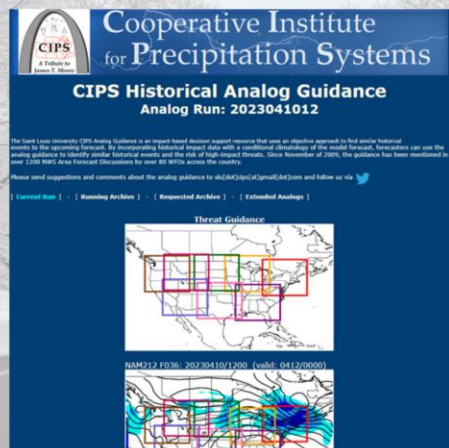
Some model forecasts struggled with the low-level surface temperature profile on March 2nd. This slide shows a model forecast from the GFS on the left, valid at 12 UTC at Albany, NY showing a mixed boundary layer with temperatures above freezing at the surface, implying that the primary precipitation type at that time would be rain. The observed sounding on the right at 12 UTC showed much colder boundary conditions, which resulted in the primary precipitation type being snow.

Forecast vs observed snowfall – 2 March 2018



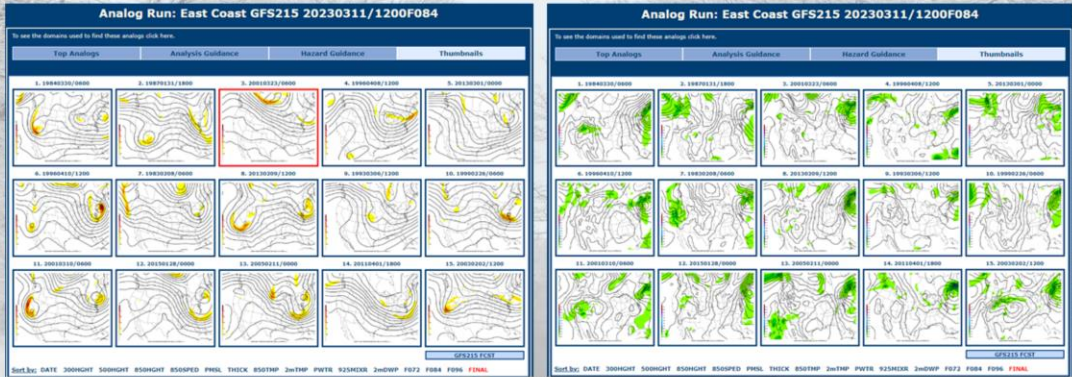
The forecasts from the National Weather Service on March 2nd indicated that heavy snow would fall over higher terrain, but just a few inches were forecast in the Hudson Valley. Observations indicated that up to a foot fell even in the valley, with as much as 2 to 3 feet over higher terrain. The under-forecast of snow in the Hudson Valley was likely due to some of the models being too warm in the boundary layer in the Hudson Valley.

Objectively determined analogs



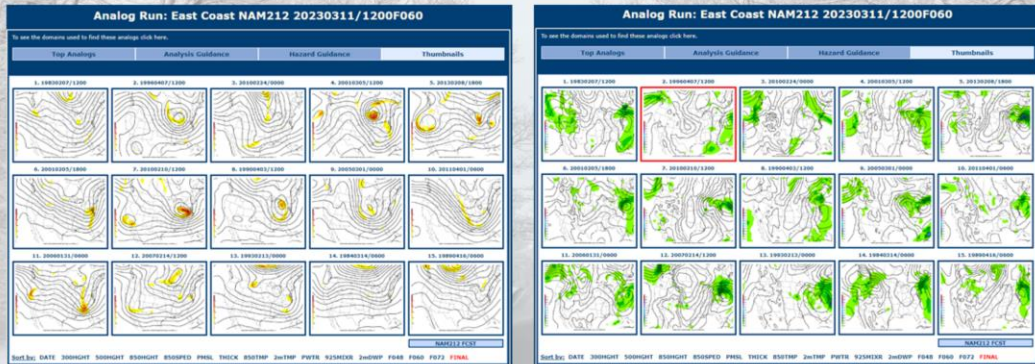
Objectively determined analogs are available at the CIPS historical analog guidance web site hosted by Saint Louis University.

CIPS analogs – based on an 84 hour forecast valid 00z on the 15th



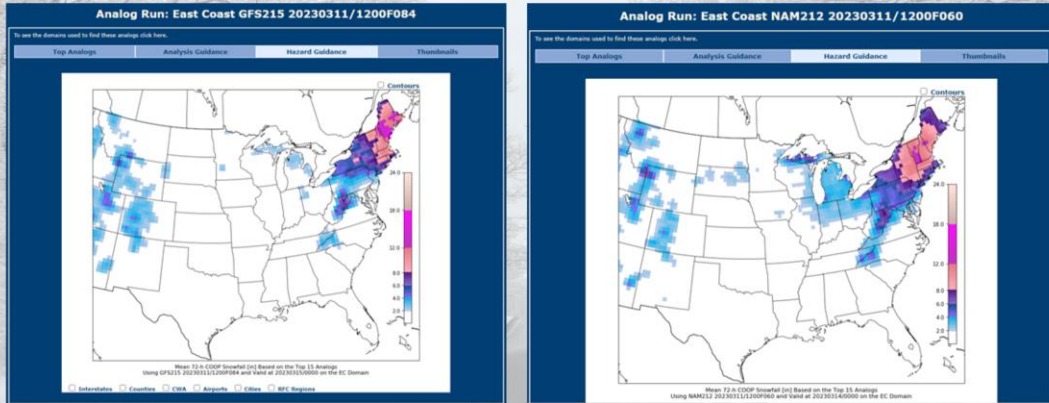
This system uses model forecasts of various flow-based parameters to search an extensive historical data base to determine historical analogs for current cases. This slide shows 500 mb and surface patterns from the objectively determined analogs that were returned for the March 14th case based on 84 hour forecasts.

CIPS analogs – based on a 60 hour forecast valid 00z on the 15th



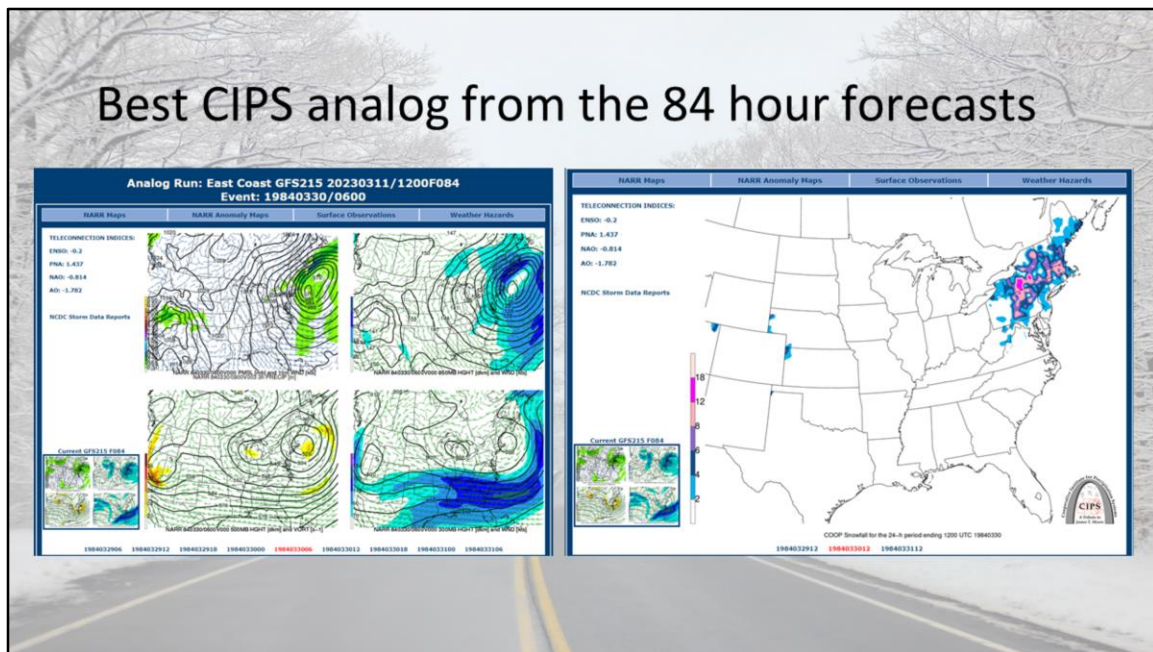
This slide shows the flow patterns from objectively determined analogs based on the 60 hour forecast valid for the March 14, 2023 case.

CIPS analogs – mean snowfall from 84 and 60 hour forecasts



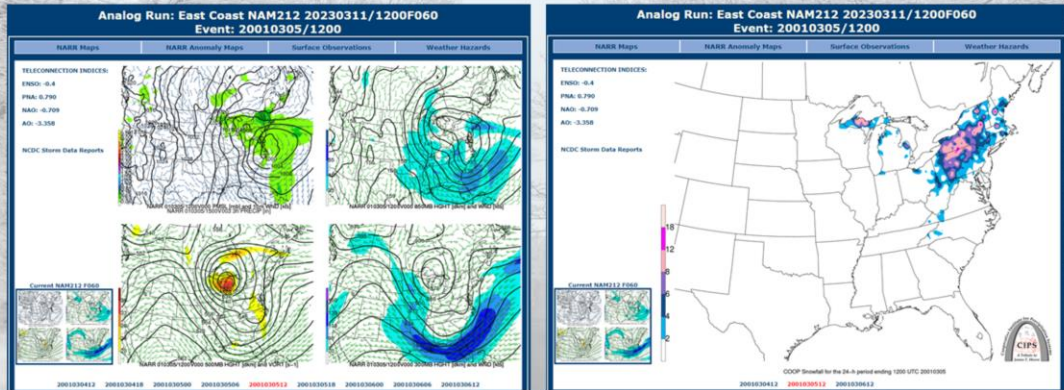
Mean snowfall from the 4 analogs based on the 84 hour forecasts (left) and 60 hour forecasts (right) are shown on this slide. Heavy snow potential for eastern New York and New England can be inferred from these slides. There was a tendency for the heaviest snow to shift westward toward eastern New York from the 84 to 60 hour forecasts.

Best CIPS analog from the 84 hour forecasts



The objectively determined best analog based on 84 hour forecasts valid at the time of the 14 March, 2023 storm was March 30, 1984. Snowfall from that storm is shown on the right.

Best CIPS analogs from the 60 hour forecasts (March cases only considered)



The best objectively-determined analog from the 60 hour forecasts was March 5, 2001. Snowfall from that case is shown on the right.