

Weathernews Hybrid Ocean Current

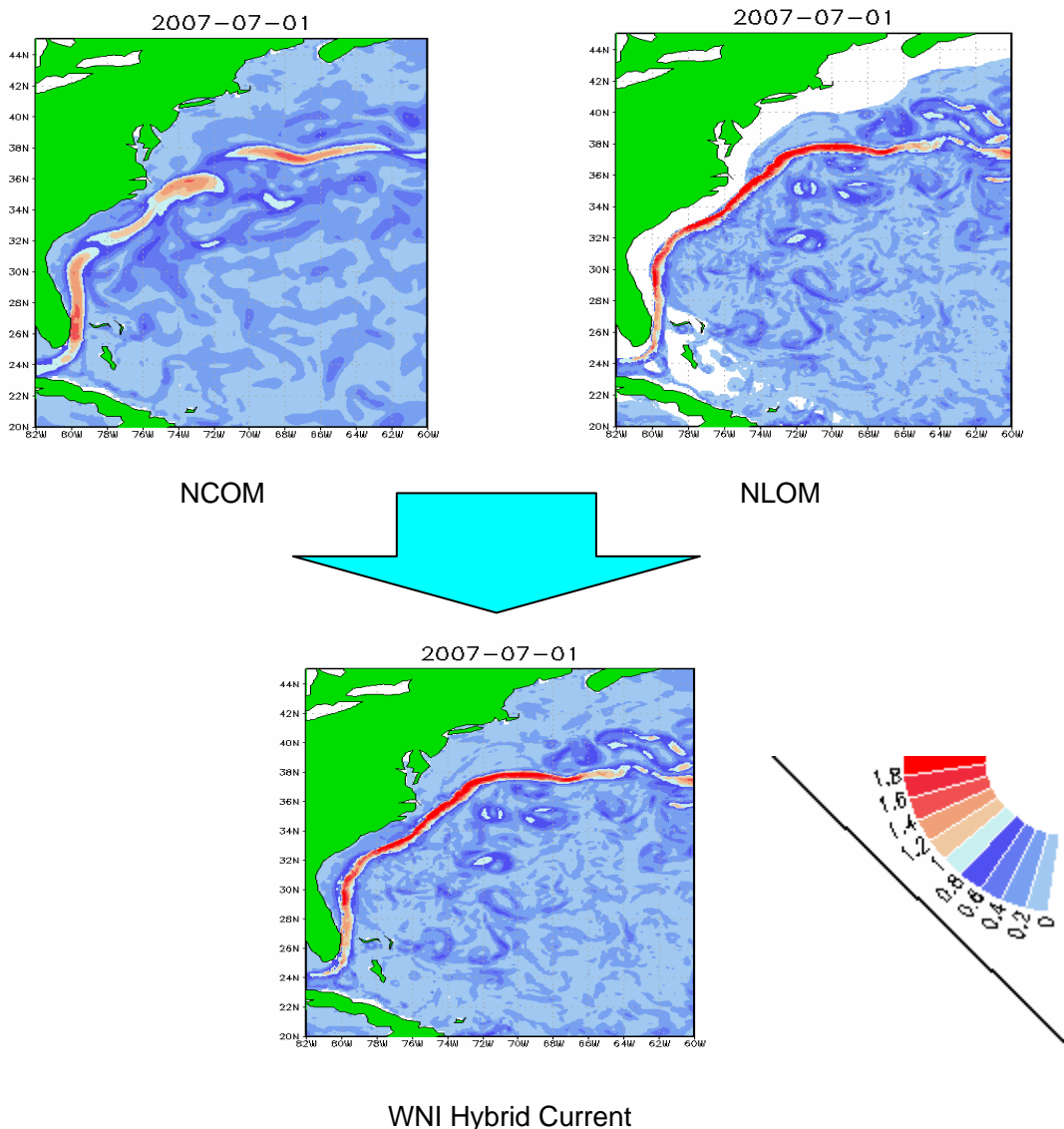
September 27, 2007

Weathernew. Inc

1. Weathernews (WNI) Hybrid Current

Weathernews (WNI) Hybrid Current utilizes aggregated data compiled from the global ocean dynamic circulation models, the US Navy NLOM (Naval Research Laboratory Layered Ocean Model) and NCOM (Naval Research Laboratory Coastal Ocean Model). NLOM is a global multi-layer model with a 1/32 degree grid depicting the ocean currents and ocean dynamics. NCOM adopts the more detailed physical process of Mixed Layer Calculation in order to express current conditions in the shallow areas over continental shelves.

NLOM captures currents such as the Gulf of Mexico current, the Kuroshio current and the Agulhas current, while NCOM better depict current conditions in shallow sea territories. WNI uses the strong points of both products.



In the above graphics you can see that NLOM depicts the Mexico Gulf Stream precisely, while NCOM shows current conditions on the coastal area of the US Continent. WNI Hybrid Current successfully depicts both areas with high accuracy.

2. Features of NLOM, NCOM and WNI Hybrid Current

	NLOM (NRL Layered Ocean Model)	NCOM (NRL Coastal Ocean Model)	WNI Hybrid Current
Resolution	1/32 degree	1/8 degree	1/8 degree
Analysis Update Frequency	1 / day	1 / day	1 / day
Forecast Update Frequency	1 / week	1 / day	1 / day
Forecast Period	Max 30 days	3 day forecast	Max 30 days
Feature	Ocean circulation well depicted	Coastal area on continental shelf well depicted	Ocean and coastal currents well depicted
Advantages for Voyage Planning	Good for ocean crossing voyages	Good for coastal regions.	Good for all areas having advantages of both products

a) NCOM (NRL Coastal Ocean Model)

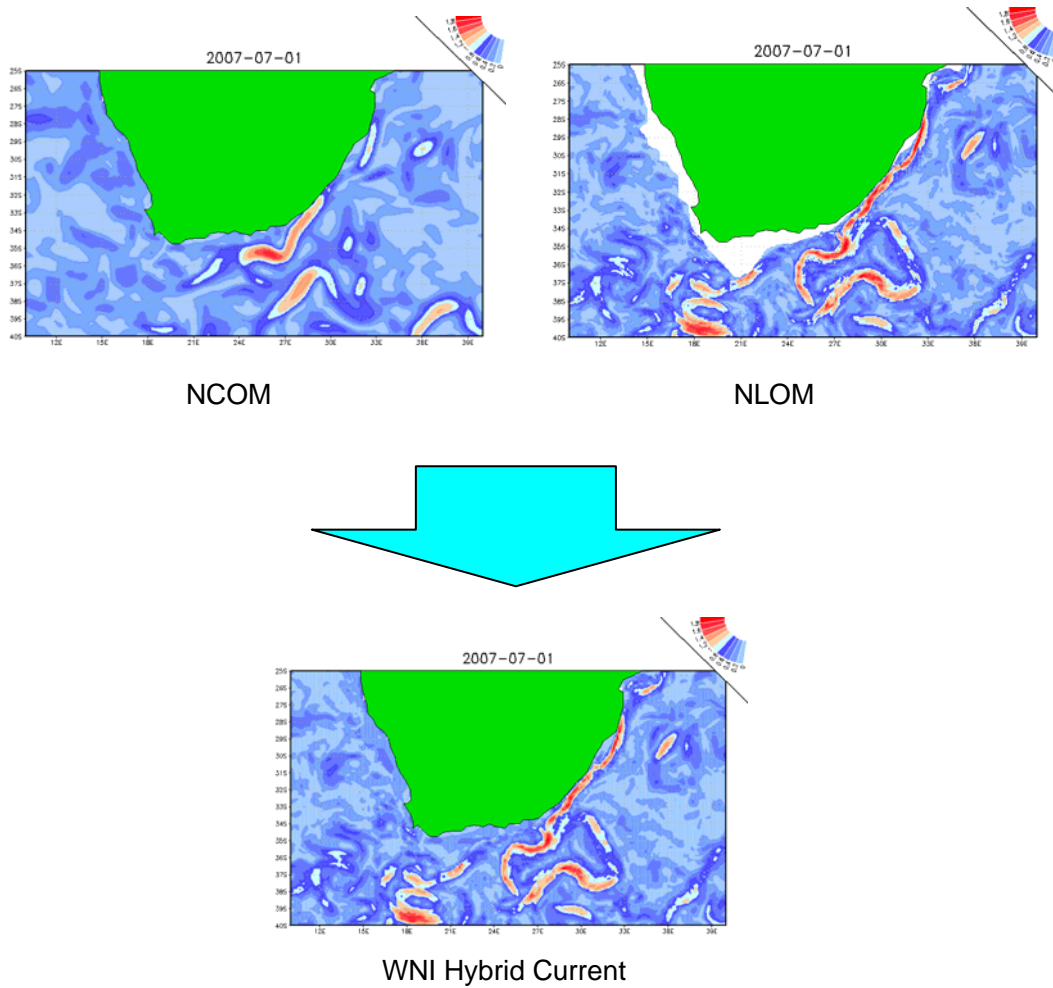
NCOM is calculated for global oceans every day, including shallow water areas on the continental shelves. It provides good short term forecasting guidance via a detailed calculation of the sea mixing layer. But its forecast period is limited to 72 hours.

b) NLOM (NRL Layered Ocean Model)

Naval Research Laboratory reports that proper model calculation of the Mexico Gulf Stream type current requires at least 1/32 degree resolution. Since NLOM has 1/32 degree resolution with forecast period extending up to 30 days, NLOM can be said to be the most appropriate operational model for Voyage Planning. But it does not calculate current conditions in the North Sea, the Arctic Ocean and the East China Sea, etc.

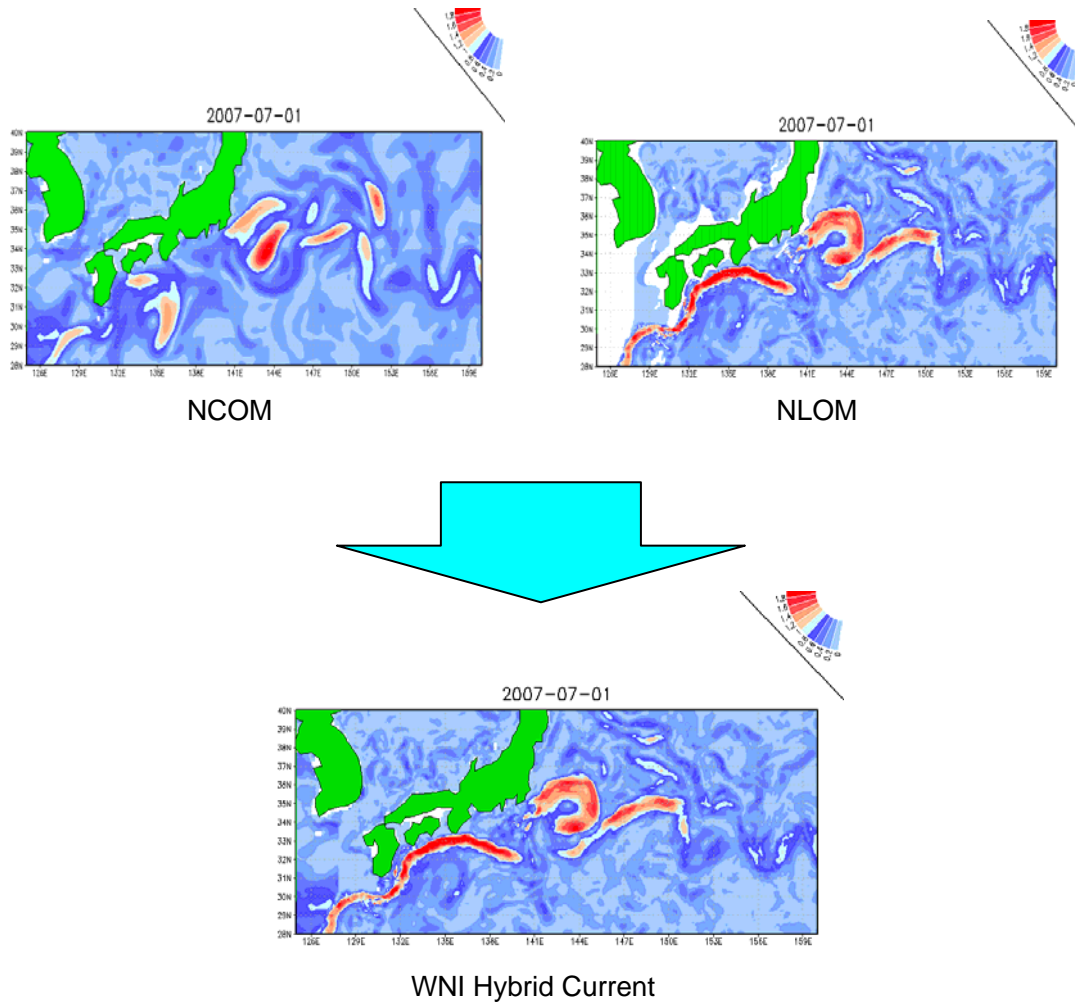
Both products have advantages and disadvantages. Thus Weathernews has created an aggregate of both model outputs producing a unique global current database – the WNI Hybrid Current, which can be utilized for all voyages: both transoceanic and those in shallow waters.

Reference 1 : the Agulhas Region



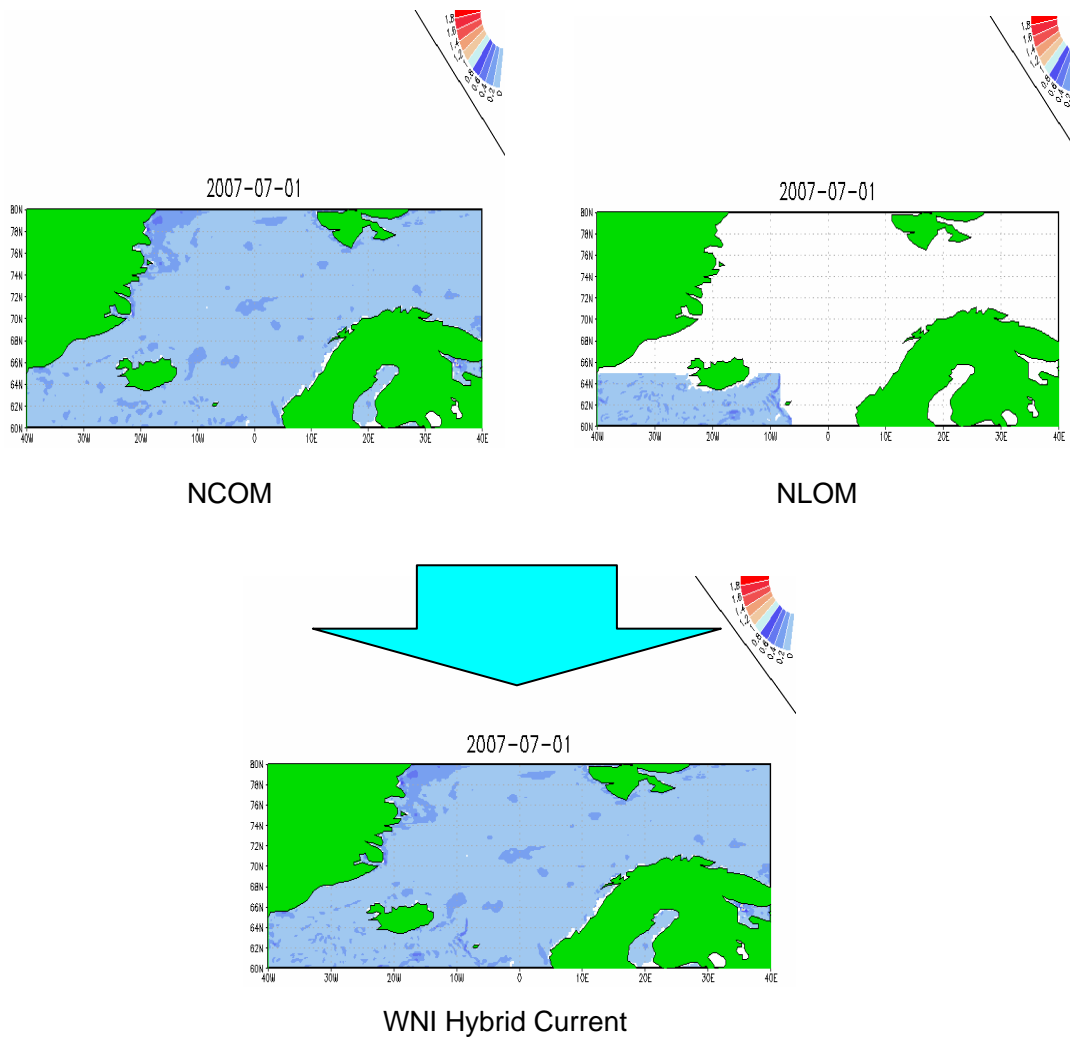
NLOM depicts the circulation of the Agulhas current well but it does not calculate the coastal regions of the African continent. The WNI Hybrid Current depicts the Agulhas current as well as the coastal regions of the African continent.

Reference 2 : Kuroshio region



NLOM depicts the great meandering of the Kuroshio current well, but does not calculate the East China Sea area. The WNI Hybrid Current depicts the Kuroshio current and current conditions in the East China Sea.

Reference 3 : the Norwegian Sea



NLOM fails to calculate most of the Norwegian Sea, but it is provided by NCOM. The WNI Hybrid Current depicts the current information in all regions.