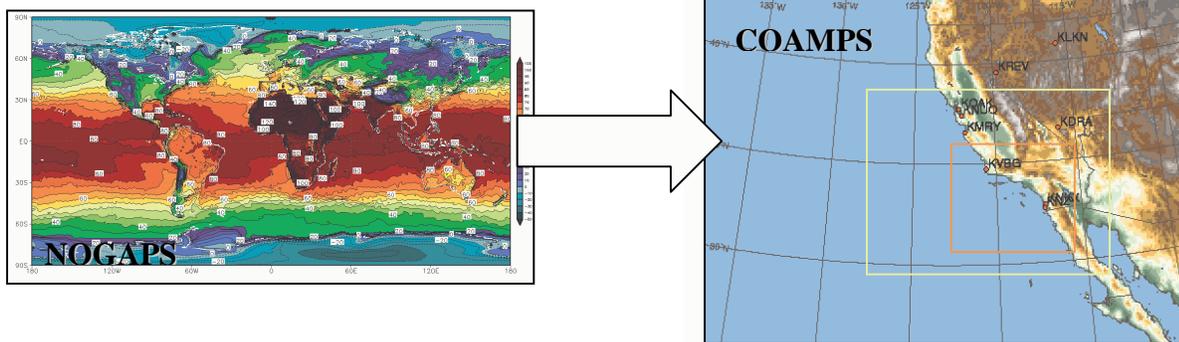


Data Requirements for the Coupled Ocean/Atmosphere Mesoscale Prediction System – On Scene COAMPS-OS™ version 1.2



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I. Specifications for the Flat File Interface to COAMPS™ using NOGAPS with COAMPS-OS™

The Naval Research Laboratory's (NRL) Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS™) and its forward-deployed implementation COAMPS – On Scene (COAMPS-OS™) are limited-area modeling systems that require time-dependent lateral boundary condition files from a large scale atmospheric forecast model to provide the synoptic scale forcing at the boundaries of the limited-area domains. The bulk of the required files are typically produced by the Navy Operational Global Atmospheric Prediction System (NOGAPS) and supplied by the Fleet Numerical Meteorology and Oceanography Center (FNMOC). Table 1 is a list of the required lateral boundary condition files for COAMPS as run using the COAMPS-OS™ system. COAMPS-OS usually runs with data from the previous watch so, with the exception of the ocean fields, the first forecast time (tau) required is 12 hrs. The interval between forecast times are typically 6 hrs although 3 hrs can also be used and is a better choice to capture synoptic variability. The tradeoff is network bandwidth and disk storage space.

Table 1. List of Lateral Boundary and Initial Fields Needed by COAMPS-OS™.

Model: NOGAPS One Degree Taus: 12, 18, 24, 30, 36, 42, 48, 54, 60 hours Levels: 1013.0, 1000.0, 975.0, 950.0, 925.0, 900.0, 850.0, 800.0, 700.0, 500.0, 400.0, 300.0, 250.0, 200.0, 150.0, 100.0, 70.0, 50.0, 30.0, 20.0, 10.0 millibars Parameters: Geopotential Height (meters), Wind U Component (meters/sec), Wind V Component (meters/sec), Air Temperature (degrees Kelvin), Water Vapor Pressure (millibars)
Model: NOGAPS One Degree Taus: 12, 18, 24, 30, 36, 42, 48, 54, 60 hours Levels: 10.0 meters Parameters: Wind U Component (meters/sec), Wind V Component (meters/sec)
Model: NOGAPS One Degree Taus: 12, 18, 24, 30, 36, 42, 48, 54, 60 hours Levels: Surface Parameters: Sea Level Pressure (millibars)
Model: NOGAPS One Degree Tau: 12 hour Levels: Surface Parameters: Ground Wetness (fraction 0-1), Ground/Sea Temperature (degrees Kelvin), Snow Depth (meters)
Model: OCEAN_MVOI One Degree (Model 78)

Tau: 0 hour Levels: Surface Parameters: Sea Ice Concentration (fraction 0-1), Sea Surface Temperature (degrees Kelvin), Sea Surface Height Correction (meters)
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Table 1 also lists the levels and level type associated with each parameter. COAMPS™ uses data from parameters on pressure levels, winds at the 10 m level, sea level pressure, and ocean and ground parameters at the surface. The list of pressure levels may increase in the future from the current 21 levels to 27 levels. Currently, 1 deg NOGAPS fields are used by COAMPS-OS™ and COAMPS™ at FNMOC uses ½ deg fields. Again, the tradeoff is network bandwidth and disk storage – ½ deg fields are the better choice.

The fields listed in Table 1 are written to disk as two-dimensional binary files for use by COAMPS™. The file naming convention is a 36-character string with the following format: namea1yyyymmddhhHHHmmslevelleveltyp where the string breaks down as:

- column 1-4: 4 character parameter name: see Table 2 for the mapping to the parameters in Table 1
- column 5: 'a' for atmospheric fields, 'o' for ocean fields
- column 6: Represents nest number, 1 for NOGAPS
- column 7-10: Base Time Year
- column 11-12: Base Time Month
- column 13-14: Base Time Day
- column 15-16: Base Time Hour
- column 17-19: Forecast Tau in Hours (000 – 999)
- column 20-21: Forecast Tau in Minutes (set to 00)
- column 22-23: Forecast Tau in Seconds (set to 00)
- column 24-28: First Level Value, right justified with leading zeros
- column 29-33: Second Level Value (set to 00000 for NOGAPS)
- column 34-36: Three character height type – prl for pressure level data, sfl for surface level data, sll for sea level data or hsl for height above mean sea level data

An example filename is dvala1200307180001200000001000000prl that represents the NOGAPS 12 hr forecast of the 10 mb height field for a base time of 00Z 18 July 2003.

There is also a 64-character convention for naming NOGAPS files that COAMPS-OS™ may switch to in the future.

Table 2. Parameter naming convention.

Parameter	4-Character Name	3-Character Height Type
Geopotential Height	dval	prl
U Wind Component	uuuu	prl
V Wind Component	vvvv	prl
Air Temperature	tttt	prl
Water Vapor Pressure	vapr	prl
10 m U Wind Component	uuuu	hsl

10 m V Wind Component	vvvv	hsl
Sea Level Pressure	slpr	sll
Ground Wetness	gwet	sfl
Ground/Sea Temperature	ttgg	sfl
Snow Depth	snwp	sfl
Sea Ice Concentration	icec	sfl
Sea Surface Temperature	tsea	sfl
Sea Surface Height Correction	htss	sfl

NOGAPS is an spherically projected global grid that has one-degree resolution in latitude and longitude. Global NOGAPS data is written to binary files with the first point the lower left hand corner of the grid representing latitude 90 degrees south and longitude 0 degrees (Prime Meridian) and scanning in the positive x direction (east in longitude) and then in the positive y direction (north in latitude). The size of the grid is 181 by 360, however, the size of the flat files are 360 X 181 X (4 byte size of float) + 4 bytes + 4 bytes = 260648 bytes due to a 4 byte padding at the beginning and end of each file (in the FORTRAN convention).