PACKAGE ID - 001232UNIXW00 ALGE

KWIC TITLE - ALGE

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LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 12/31/1996 **PUBLICATION DATE -** 08/11/1997

DESCRIPTION - ALGE is 3-dimensional, time-dependent, hydrodynamic code that was developed specifically to interpret and analyze remote sensing data, particularly thermal imagery. ALGE uses finite difference techniques to solve the hydrostatic form of the partial differential equations that model conservation of momentum, mass and thermal energy. ALGE also solves the two-dimensional system of equations that allows the movement of a free water surface to be simulated and predicted. The partial differential equation that models the transport, diffusion and deposition of particles is also solved. ALGE has simulated cooling lakes, thermal discharge to rivers, tidally driven currents in bays and estuaries and thermal discharge to the ocean. Subroutines can be called that compute the amount of heat entering or leaving a body of water due to evaporation, convection, solar radiation absorption and thermal radiation flux divergence. Turbulence is modeled with a Level 2.5 Yamada closure model. ALGE can perform simulations with highly variable land-water boundaries and water depths. Mass sources and sinks can easily be inserted into the computational domain to simulate man made thermal discharges. ALGE has been verified with data from Savannah River Site cooling lakes and thermal discharges to the Savannah River, tide data from Delaware Bay and other bays, and cooling lake and ocean discharge data from classified sources. The verification work shows that the ALGE code reproduces both the surface and subsurface temperature distributions in cooling lakes and discharges to bays and the ocean. A description of the ALGE code and verification against cooling lake data has been published in the open literature. Several classified reports on applications of ALGE have also been published.

PACKAGE CONTENTS - Media Directory; Software Abstract; Media Includes Executable Module; Software Supporting Documentation; SRTC-NN-95-25 REV.1;

SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - Second-order upstream finite differencing is used. The solution to the 3-D and 2-D (free wtaer surface systems of equations is done interactively, with the solution from one set of equations feeding the solution to the other set at each time step.

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METHOD OF SOLUTION -(CONT)
COMPUTER - UNIX WORKSTATIN

OPERATING SYSTEMS - UNIX

PROGRAMMING LANGUAGES - Fortran

SOFTWARE LIMITATIONS - Does not handle non-hydrostatic flows.

SOURCE CODE AVAILABLE (Y/N) - N

UNIQUE FEATURES - ALGE is unique, or nearly uniqie in thet it combines 3-D hydrodynamic simulations with a free water surface simulation, comprehensive heat transfer models and a particle tranport model. In addition, it allows the user to easily put in multiple mass sources and sinks, time varying water levels at the boundaries (for tidal simulations) and can simulate extremely irregular land-water boundaries, including islands. We do not know of any other code that combines all these features.

RELATED SOFTWARE - Any graphics package that allows user to display results in 2-D and 3-D plots.

HARDWARE REQS - Most modern workstations with at least 64 MB memory will do.

TIME REQUIREMENTS - From minutes to days depending on the size of the problem.

REFERENCES - A.J. Garrett, ALGE: A 3-D Thermal Plume Prediction Code for Lakes, River and Estuaries, SRTC-NN-95-25 Revision 1, August 11, 1997.

ABSTRACT STATUS - Released AS-IS 8/17/1998

SUBJECT CLASS CODE - HZ

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
A CODES
HEAT TRANSFER
LAKES
RIVERS
THERMAL POLLUTION
PLUMES

EDB SUBJECT CATEGORIES -
990200 540140

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS