

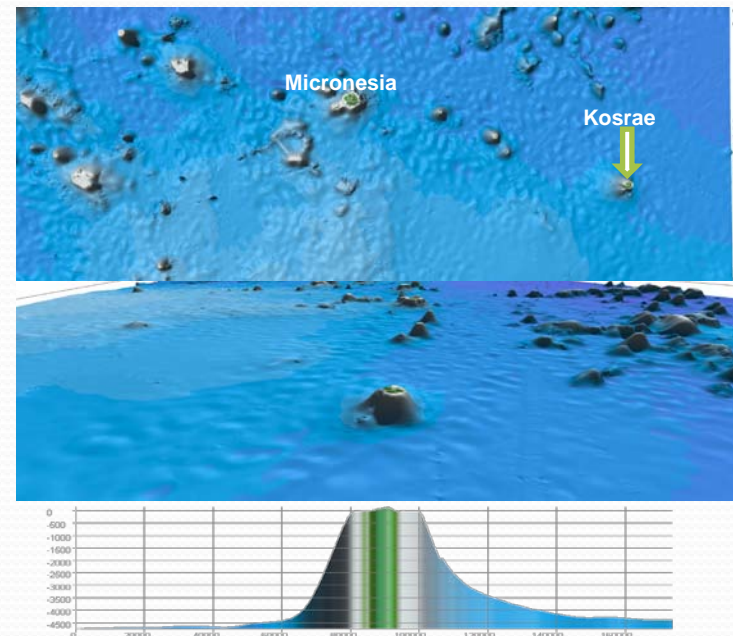
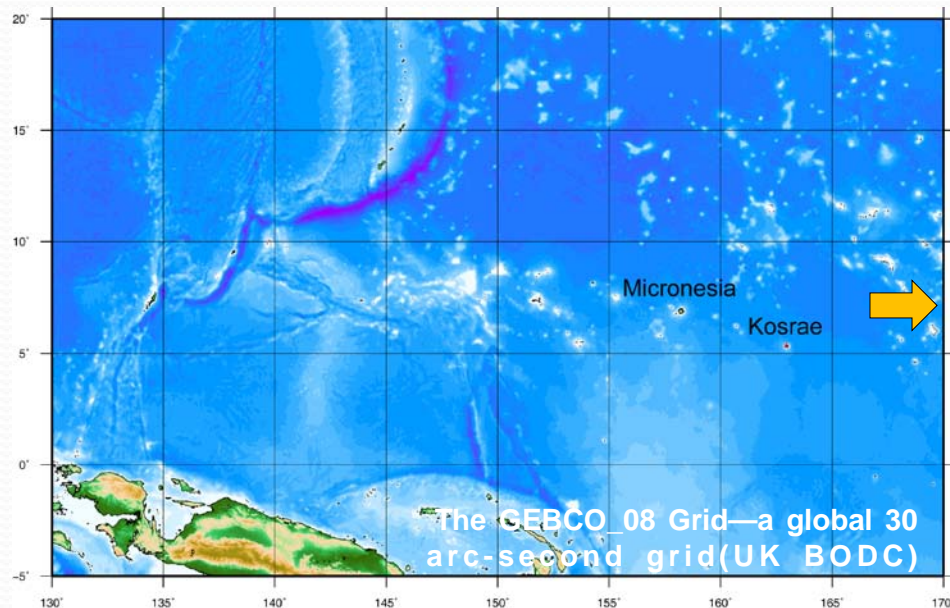
# **Effect of OTEC Thermal Effluent on the Kosrae Coastal Waters of the Micronesia**

2013. 09. 09

**Jongkyu Kim, Jongyoon Mun : Chonnam National University**  
**Hyeon-Ju Kim : Korea Institute of Ocean Science and Technology**

## Objective :

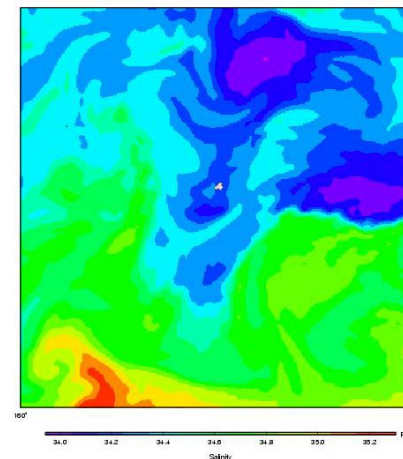
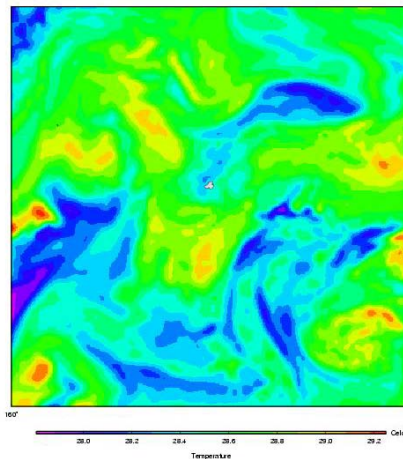
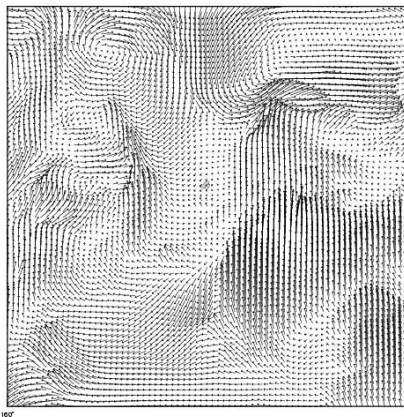
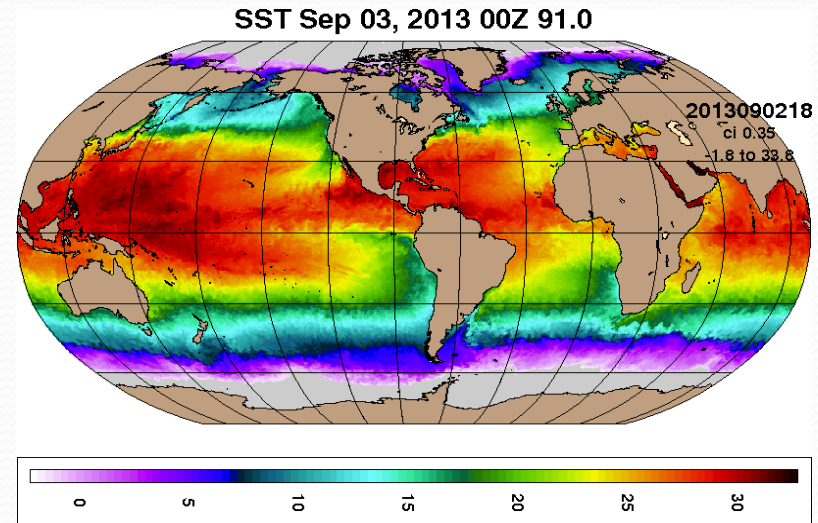
- improve our understanding of the flow characteristics around the Kosrae Coastal Waters
- Global Circulation Model(HYCOM) or Regional Ocean Model(FVCOM)
- Plume Model(EFDC Explorer or CFD(Flow-3D))



# GCM (Global Circulation Model, HYCOM)

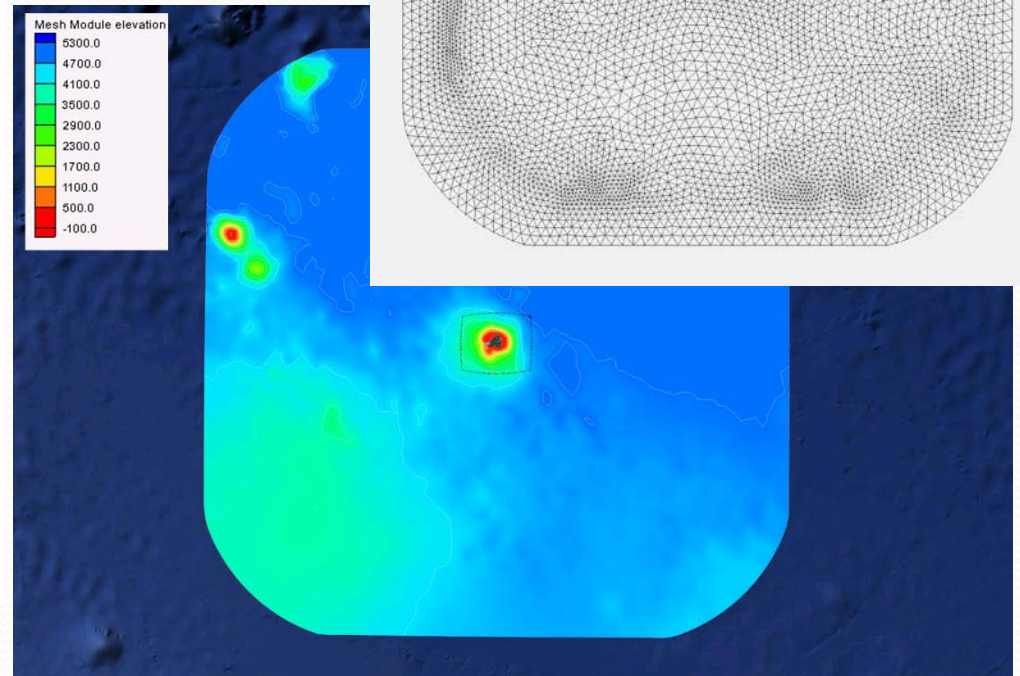
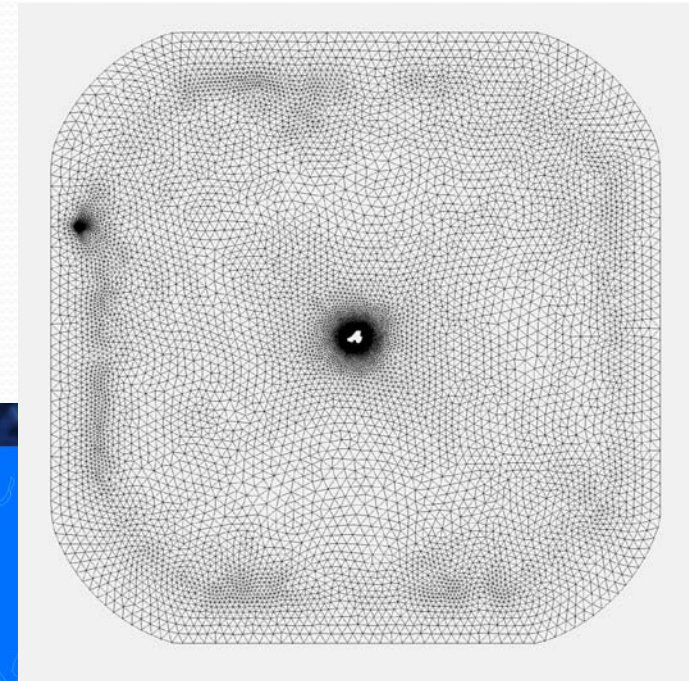
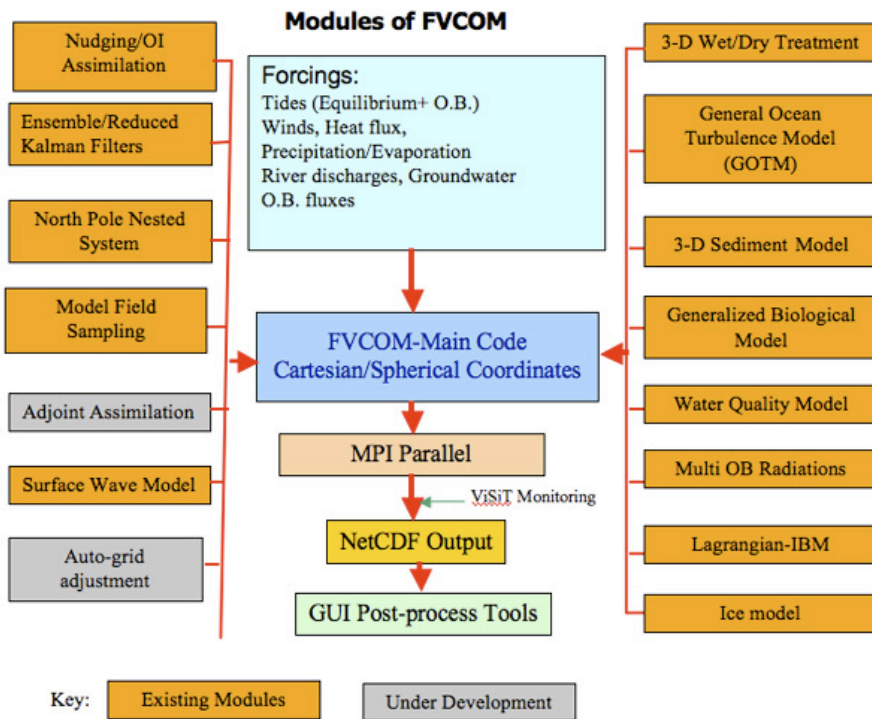
## *Real-time 1/12° Global HYCOM Nowcast/Forecast*

This global system (labeled 90.9) has been using atmospheric forcing from the Navy Operational Global Atmospheric Prediction System (NOGAPS). It has been replaced by the NAVy Global Environmental Model (NAVGEM). The Naval Oceanographic Office switched this system to NAVGEM forcing on August 20, 2013 (labeled 91.0). Posted 21 August 2013



# ROM (Regional Ocean Model, FVCOM)

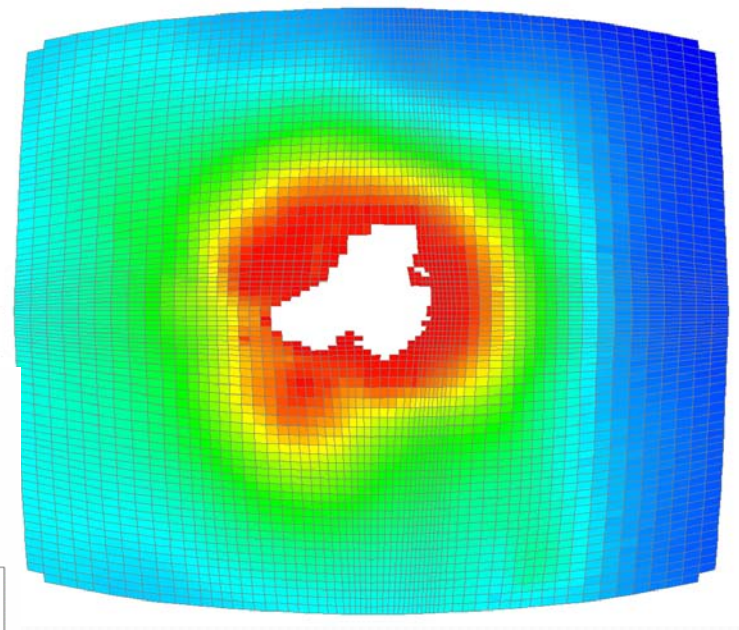
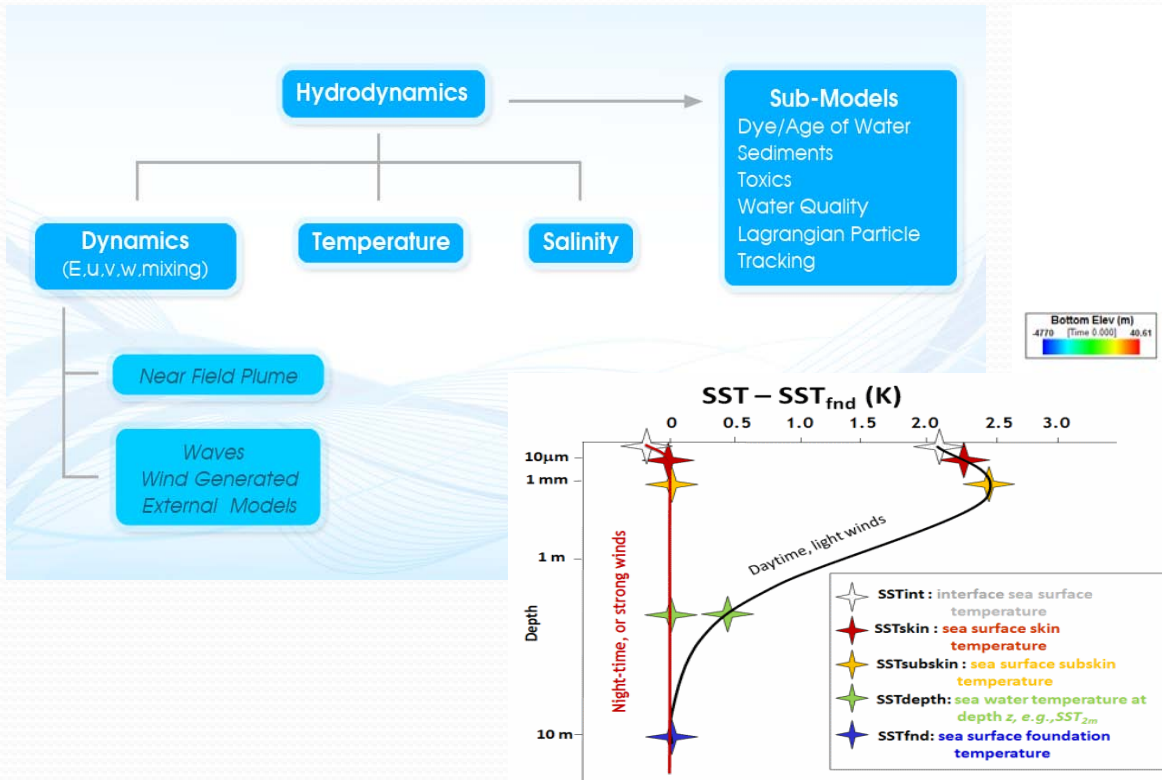
FVCOM(Chen, C. R. H. Liu and R. C. Beardsley, JAOT, 2003)



# Plume Model (EFDC Explorer and CFD(Flow-3D))

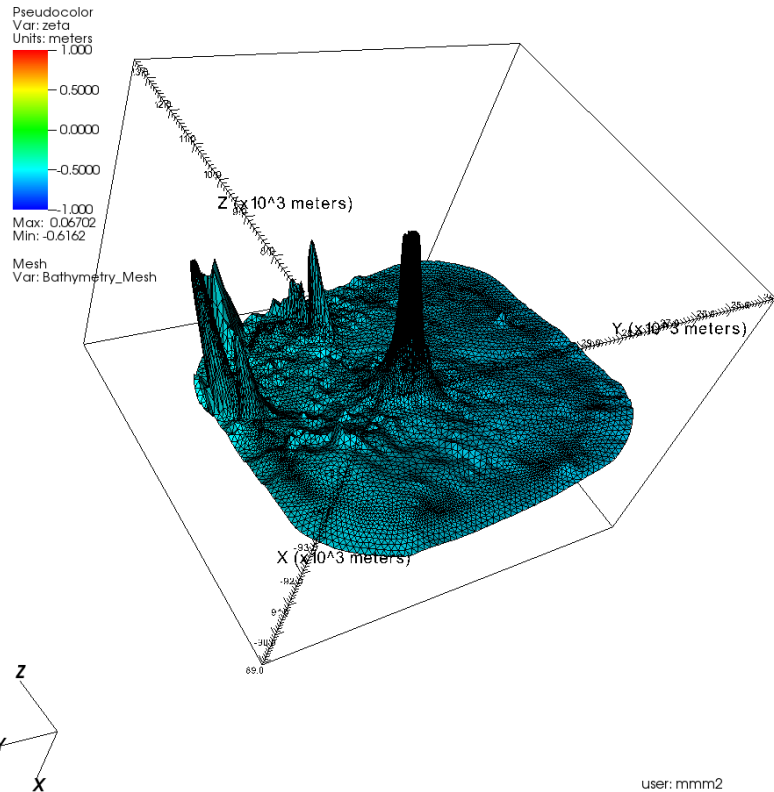
EFDC(Hamrick, 1992, VIMS)

Curvilinear grid : 84×69



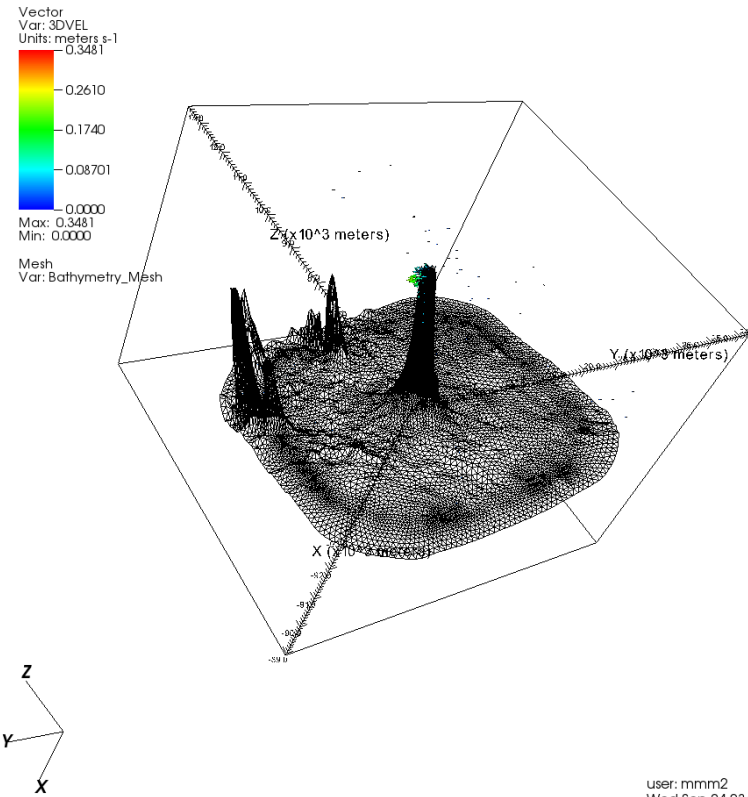
# ROM (Regional Ocean Model, FVCOM)

DB: Kosrae09\_0002.nc  
 Cycle: 331200 Time:55928.9



user: mmm2  
 Wed Sep 04 23:47:03 2013

DB: Kosrae09\_0002.nc  
 Cycle: 331200 Time:55928.9



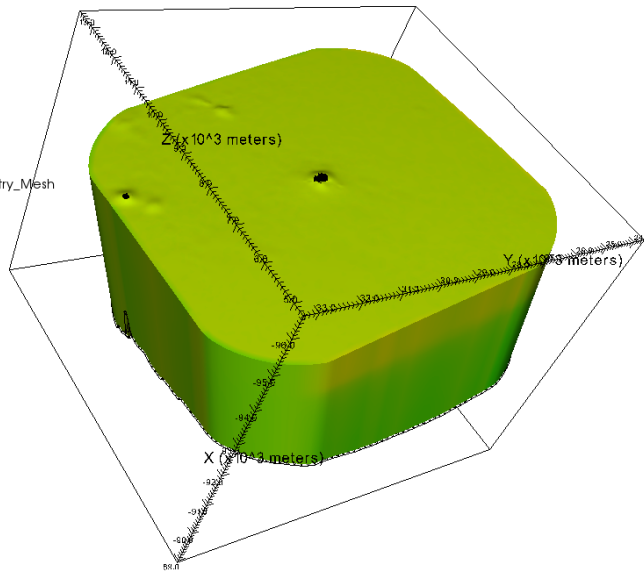
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# ROM (Regional Ocean Model, FVCOM)

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Pseudocolor  
 Var: temp  
 Units: degrees\_C  
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 21.00  
 14.00  
 7.000  
 0.0000  
 Max: 21.15  
 Min: 14.90

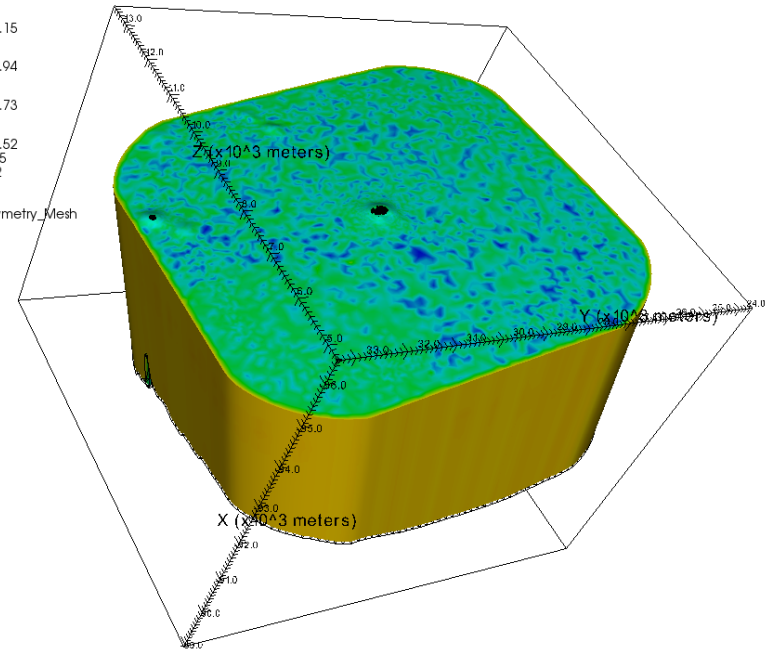
Mesh  
 Var: Bathymetry\_Mesh



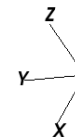
DB: Kosrae09\_0011.nc  
 Cycle: 1756800 Time:55937.2

Pseudocolor  
 Var: salinity  
 Units: 1e-3  
 35.35  
 34.15  
 32.94  
 31.73  
 30.52  
 Max: 35.35  
 Min: 30.52

Mesh  
 Var: Bathymetry\_Mesh



user: mmm2  
 Wed Sep 04 23:50:10 2013

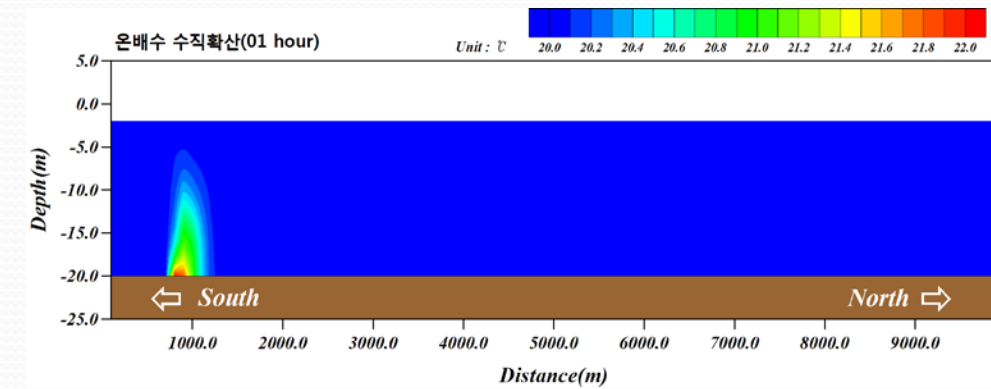
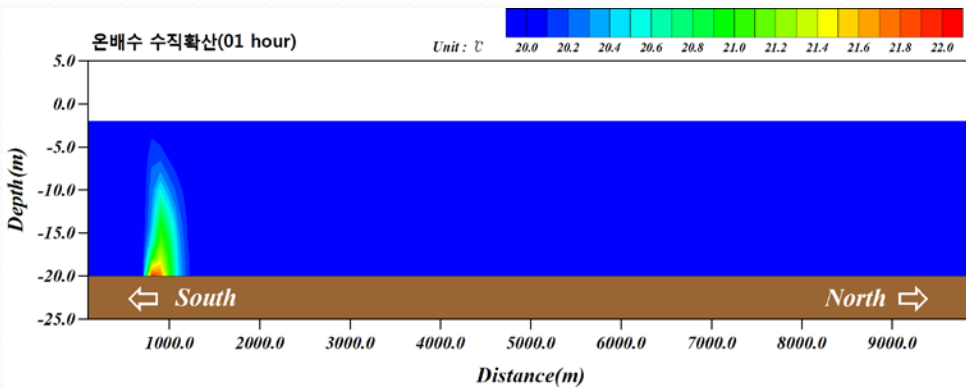
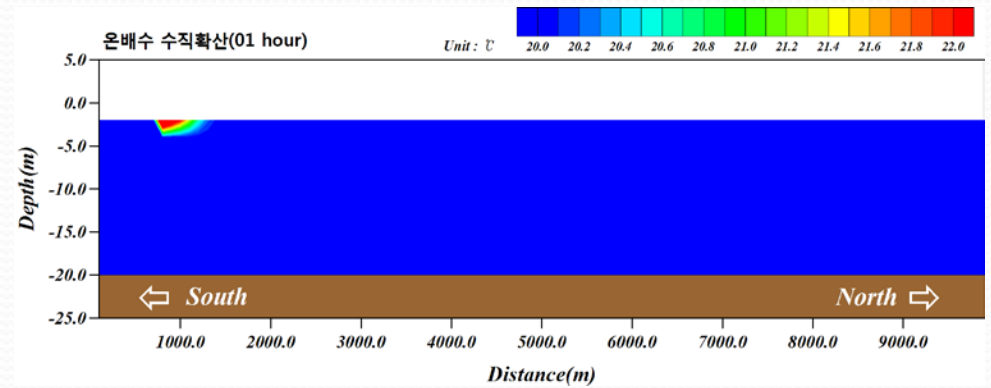
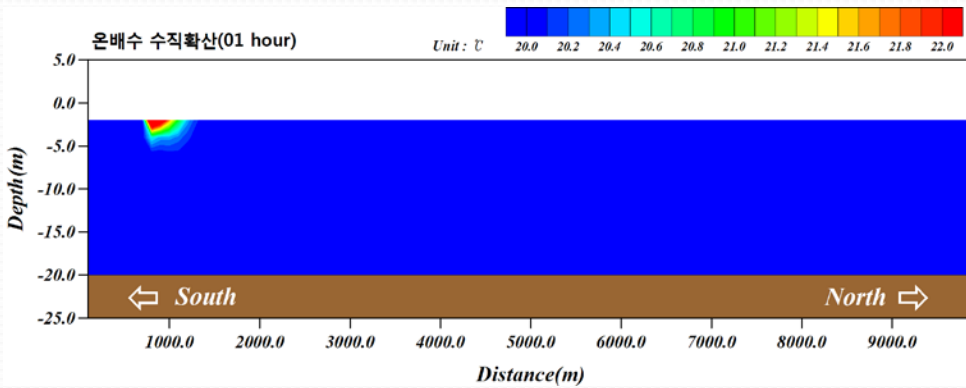


user: mmm2  
 Fri Sep 06 09:31:29 2013

# Plume Model(Flow-3D, FLOW Science)

VDC  $1E-3 \text{ m}^2/\text{s}$

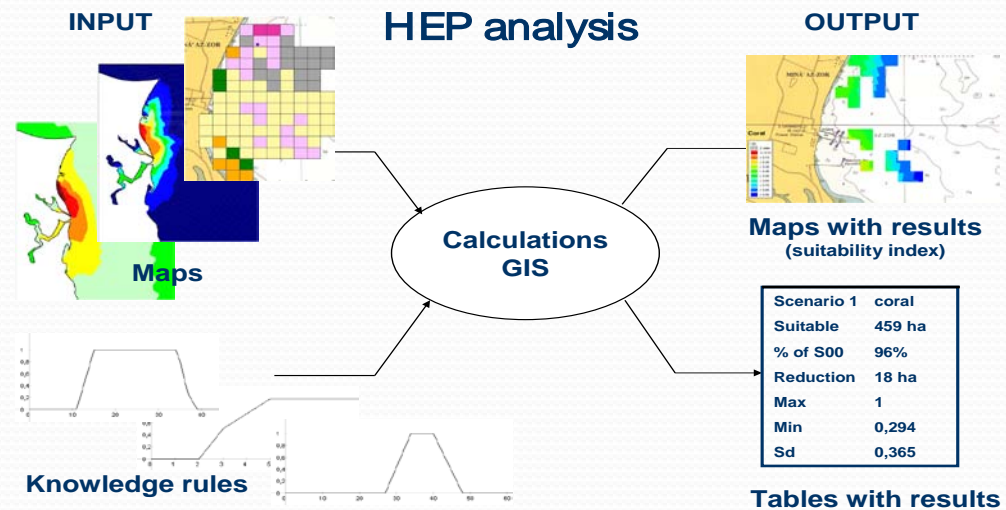
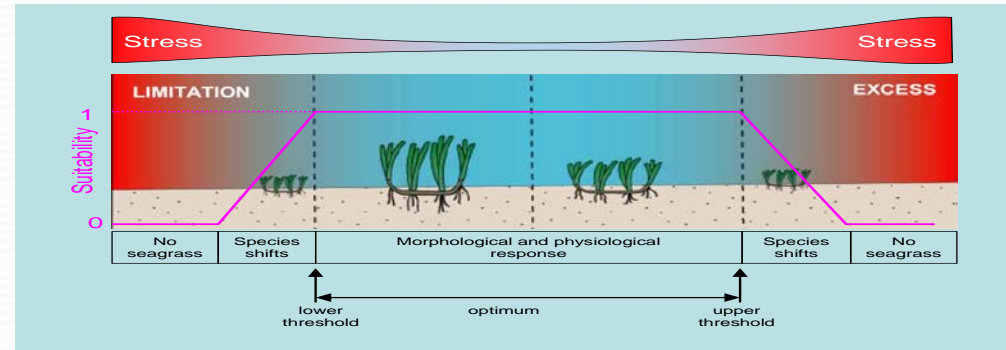
VDC  $1E-4 \text{ m}^2/\text{s}$





# Summary and Perspectives

- The ocean and plume model are helping us make design decisions.
- The degree of impact of an OTEC facility will depend on location & design.
- Further studies are being carried out to analyze the three dimensional nature of fluid flow and to develop better numerical models.



Habitat Evaluation Procedure (HEP)



Thank you for your attention!

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