ELCIRC User Group Meeting-

http://www.ccalmr.ogi.edu/CORIE/modeling/elcirc/meeting.html

(Personal notes from Aaron Racicot – aaronr@ccalmr.ogi.edu)

Morning – Day 1

Opening – Antonio
General overview…
Looking for feedback from community on future of ELCIRC.
Need to focus on the community – Forum, code updates (maybe cvs versions of the code? http://sourceforge.net/index.php ?)

Joseph
SMILE grid generation tool – Germany
SMS grid generation

Paul
Need to get web resources up and available for the community… Ryan's tutorial and ACE documentation

1) Ryan's Tutorial - http://www.ccalmr.ogi.edu/~kilgren/tutorial1.htm
2) ACE/Tools - http://amb1019.ccalmr.ogi.edu/doc/

Interest in G3. Worry about VMWare compatibility for Linux.

Cheryl Ann Blain - NRL
Tim Campbell – Mississippi State University doing coding

1) Ghost nodes/sides/elements
2) Backtracking queue

Joseph – SELFE
Interesting work going forward… very preliminary
FE formulation

Afternoon – Day 1

Ewa Jarosz – NRL
Antonio - Try removing horizontal diffusion – Numerical diffusion already exists
Northern boundary condition does not take into consideration evaporation in the Northern Red Sea.
Questioning whether it was currents or mixing that caused the dense water to be driven from the straight.

Ligia Pinto – LNEC
Looking at Stratification
Satellite imagery to define the domain!

Stratification criteria – Prandle 1985
Tidal influence is dominant to river flow in terms of stratification.
Antonio – UB is better in the plume than MY – Recommended to try UB

Anabela Oliveira – LNEC
Looking at Lagoon
Big problem – Migration of the inlet
ADCIRC – Mass conservation problems
Changed to the frequency domain for the model data output
Changed the friction formulation – Manning formulation
Issues with ADCIRC and wetting and drying – Suggested to try most recent version of ADCIRC with code fix.

John Morrison – IOS Canada
Biologically focused
4 types of organisms
1) Benthic - Bottom
2) Pelagic - Top
3) Vertical migration
4) Passive

Largely focused on the seeding conditions
Life span consideration
Biological connectivity of national parks through random distribution of particles and seeing where they tend to over time.
Very depth dependent – Surface much more interconnected
Wind counts very much as well… maybe interconnected!

Harry Wang & Joe Cho– VIMS
Chesapeake Bay – ELCIRC and UnTRIM
SMS used to merge 2 grids
Using JANET software to make orthogonal grids from original.
Barotropic simulation
ELCIRC was underestimating tidal amplitude in the bay
Looking at 3 possible areas for explanation:
1) Treatment of the definition of the element depth
2) Bottom friction formulation - Cd
3) Time Step – Based on York River Simulation and evaluation of R^2

Looking at doing baroclinic simulations
Quarter annulus solution looked closer.
Might want to look at the M6 to see the effect of bottom friction.

Mike Foreman – IOS Canada
Broughton Archipelago -
Trouble getting accurate boundary conditions.
Delta t is 5 minutes
ELCIRC doing a good job capturing many of the eddy and estuarine flow features

HAB off Juan de Fuca Strait -
June and September 2003 Cruise comparison
Using satellite imagery (MERIS) to look at chlorophyll
Quesnel Lake –
Large temperature fluctuations – Crucial for salmon migration
MY & KKL are too diffusive – Setting very small number
Time step looks suspicious for noise generation
Need to look to at optimal time step…

Things to do:
Look at quads
Might need nesting to better resolve boundary conditions
Need to include Columbia River discharge
Need to look at heat exchange
Having trouble creating the eddies without the IC's to start with
Might look at different equation of state since salt does not matter in the lake example.

Ed Myers – NOAA
Coastal Storms Initiative
Initial work - EFDC – Environmental Fluid Dynamics Code
Wants to look at decreasing the time step and different turbulence closure scheme
There is a drastic difference between results with triangles and quads
Looking at NOS Skill Assessment Standards – Needed to pass to operational status
Looking at standard data formats – COMFS
CSDL NetCDF
Using SMS for grid generation
Tom Gross – Can get the NetCDF subroutines
Use Matlab and IDL but looking at NCL

Mike Zulauf – OGI
Atmospheric forcing and ELCIRC
Wind files
Flux files
HDF4 file format – questions on this format and ease of install
Interest, but worry about portability to different regions
Need to maybe look at the PROJ.4 library for translation of Lat-Lon data.

Morning – Day 2

Opening – Joseph, Antonio

What are the important things we want to see in ELCIRC for the future – C&L

- Making the heat exchange model portable. Ease of setup and different data formats. NCEP, MM5
- Code structure – Difficult to make code changes

- Quad grids –
    - Justification and when to use
    - How to create and visualization
    - Quantitative comparison of what you get when you migrate – need examples and benchmarks
- Speed – Need to get speed up
    - **Parallel** vs. Code optimization vs. Faster machines
    - > 100,000 nodes
    - UnTRIM vs. ELCIRC – 2:1 in favor of UnTRIM for speed on benchmarks from VIMS
- Transport equation solving
    - Volume conserving
    - No Negative concentrations
    - Less diffusion issues
- Turbulence mixing – would like to see more work here
- Small grids – re-look at hydrostatic assumption
- Memory – Running out of memory with large grids
    - Broader audience will require small memory version
- Mass and Volume conservation
- Z-Coordinates are a limitation for the sediment transport issues
    - Sigma coordinates, **S coordinates**
- Output options
    - Frequency
    - How it is tied into hot start
    - Formats – HDF, **NetCDF**
- Hot start issues
    - No Output while process is running
    - Version – 4.01 till now (seems to be Ed only on this one
    - Will try to reproduce
- More tutorials
    - More new user materials
    - More benchmarks – di-pole eddies etc.
    - Benchmark speed
- Utilities
    - Direct transfer of grid format to ELCIRC for atmospheric, not HDF
    - Drogues and particle tracking – Need to release the code
- S-Coordinates again…
- Mixed grids – more integration of knowledge
    - SMS and SMILE
- Patches
    - CVS and updates
    - Source Forge
- Need to make more convincing statement on quads vs. triangles
    - What is the reaction of the model to the grid being oriented along the flow
    - The difference between:
    - Quads vs. Triangles

    - Orthogonal triangles vs. symmetric triangles
- NetCDF Issues
    - File size
    - Computationally expensive

Issues from yesterday (Antonio)
- Inter-Model comparisons
- More pro-active work from OGI to look into code for people who are trying to apply ELCIRC

Recommendations for user setup (Antonio)
- Looking at numerical diffusion to see where to use quads and triangles
    - Looks at truncation error
    - Documented in ELCIRC paper on web
- Courant numbers – Looking at time steps
    - Delta t = delta x / sqrt(g'h) to find approximate time step
    - Cu between 1-10
- To large of time step
    - Excessive vertical mixing

Group Contributions –
Anabela – Sediment transport:
Morphodynamic modeling
Time frame – Contingent on the s-cord (or sigma cord) model (Thesis work is timed for 3 years so this caps the development of the s-cord and transport work to about 1.5 years)

IOS – Canada:
Biological issues integrated into ELCIRC

VIMS:
Biological focus for CB through VIMS
Post-Doc working on this – 22 variables
Try to put it in ELCIRC directly
(Antonio) Would really like to have UnTRIM vs. ELCIRC comparison

GoMOOS:
Still moving forward with POM
Using QUODDY for a small problem that ELCIRC might be a candidate for

Model Skill Assessment:
What would it take to get other models to run on a real world domain? Columbia?
- Resource is needed to run it
- Idea: Hire a post doc to run all of the models on one domain?

- Make the incentive to running the models on the test domain that you learn something new about YOUR model… not just the domain it is run on.

Next Meeting:
- At OGI
- Next 9-12 months
- Probably after parallel version is released

Afternoon – Day 2

Specific Problems:
Turbulence Closure Models
- Are there reasons we should look at others?

Nudging
- Allowing for chopping runs up in a smarter fashion
- Good convergence (about 2 weeks in the example shown)