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|  |  | Key features |
| 1 | Basic sim | Conc  Flux  Tdc |
| 2 | Fe SO4 | Add Fe and SO42- |
| 3 | Grid | Maxnpts, job, xl |
| 4 | Depositional flux | w00 |
| 5 | Porosity | p0 p00 |
| 6 | OMModel2 | Compare OMModel1, OMModel2 |
| 7 | Limitation – inhibition | KTEA, KIn |
| 8 | Inorganic reactions | Knh4ox |
| 9 | Adsorption | NH4 adsorption, KPO4P |
| 10 | Bioturb | imix 0, 2, DB0,xs  α0, xirrig |
| 11 | High salinity | Sal1 Sal2 |
| 12 | Sulfide sensitivity | KH2S |
| 13 | MPB | Rgpp |
| 14 | Zones | Add three zones |
| 15 | OM initial profile | OM\_Top, OM\_Min, InitMinDepth |
| 16 | Timing | Spinup, substeps, firststeps, justwaitabit |
| 17 | POM special rectangle | Fluxon, fluxoff |
| 18 | POM special triangle | Swibc |
| 19 | Time and POM | Swibc |
| 20 | kOM | Vary pomspecial2dic |
| 21 | Bottom boundary | Deep\_vals |

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|  | **Exercises** | **Parameters and variables** | **Details** | **Diagram** |
| 1 | Starting example |  | Run the model for one year.  Open candi-examples\_results.code-workspace.  Open the R folder. Open the file SixPlotsCandi-Examples.R. Run this script to generate the plots.  The plots will appear in the same directory as the glm3.nml file. |  |
| 2 | Fe and SO42- | Variables:  Fe and SO42-  aed\_sdg\_vars.csv | Add higher concentrations of Fe(OH)3A and SO42- to the file aed\_sdg\_vars. Add them to the csv column ‘default\_vals’, which sets the flux and concentration at the sediment-water interface. Set ‘feoh3a’ to 100.0E+03 (flux in mmol m-2 y-1) and ‘so4’ to 32.0E+03 (concentration in mmol m-3). Plot the output figures for ‘feoh3a’, ‘feii’, ‘so4’ and ‘h2s’. Also plot ‘ch4’ and compare its concentration to the previous example: the implication is that adding SO42- reduces the creation CH4. |  |
| 3 | Grid structure | Parameters:  maxnpts, job, xl  aed\_candi\_params.csv | Use the parameter ‘job‘ to change the grid from fixed width (0) to exponentially increasing (2).  Use ‘xl’ to change the depth of the sediment simulated, from say, 10 cm to 40 cm.  Use ‘maxnpts’ to set the number of layers simulated. Note that job 0 requires maxnpts to be depth × an integer + 1. |  |
| 4 | Depositional flux | Parameter:  w00  aed\_candi\_params.csv | Set the deposition rate ‘w00’ to be large or small. Plot and save the results after each simulation. |  |
| 5 | Porosity | Parameters:  p0, p00, bp  aed\_candi\_params.csv | Run two simulations with high and low porosity. p0 is the porosity at the sediment-water interface, and p00 is the porosity at the deep. You may find that extremes of porosity, the model experiences errors. |  |
| 6 | Organic matter model | Parameters:  OMModel1, OMModel2  aed\_candi\_params.csv |  |  |
| 7 | Organic matter limitation and inhibition | Parameters:  KTEA …, KIn …  aed\_candi\_params.csv |  |  |
| 8 | Inorganic reactions | Parameters:  Knh4ox  aed\_candi\_params.csv |  |  |
| 9 | Adsorption | NH4 adsorption, KPO4P |  |  |
| 10 | Bioturbation | Parameters:  imix, DB0,xs, α0, xirrig  aed\_candi\_params.csv |  |  |
| 11 | High salinity | Parameters:  Sal1 Sal2  aed\_candi\_params.csv |  |  |
| 12 | Sulfide sensitivity | Parameter:  KH2S  aed\_candi\_params.csv |  |  |
| 13 | Microphytobenthos | Parameter:  Rgpp  aed\_candi\_params.csv |  |  |
| 14 | Zones | Zone parameters and settings:  Add three zones  aed\_candi\_params.csv  aed.nml |  |  |
| 15 | OM initial profile | Parameters:  OM\_Top, OM\_Min, InitMinDepth  aed.nml |  |  |
| 16 | Timing | Parameters:  Spinup, substeps, firststeps, justwaitabit  aed.nml |  |  |
| 17 | POM special rectangle | Parameters:  fluxon, fluxoff  aed.nml |  |  |
| 18 | POM special triangle | swibc |  |  |
| 19 | Time and POM | Swibc |  |  |
| 20 | kOM | Vary pomspecial2dic |  |  |
| 21 | Bottom boundary | Deep\_vals |  |  |