Probabilistic Design

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Sources

Sources:
https://sourceforge.net/projects/mexcdf/files/mexcdf/mexcdf.r3551.zip
ftp://ftp.unidata.ucar.edu/pub/netcdf-java/v4.1/netcdfAll-4.1.jar

Dataset:
ftp://ftp.marine.csiro.au/pub/white/jb_ibn_srn_gtn_giy.nc.gz
or any other from:
http://www.cmar.csiro.au/sealevel/sl_data_cmar.html

Before you start

```
unzip('mexcdf.r3551.zip')                                    1
addpath ([pwd '/mexcdf/mexnc']);
addpath ([pwd '/mexcdf/snctools']);
javaaddpath([pwd '/netcdfAll-4.1.jar']);
gunzip([pwd '/jb_ibn_srn_gtn_giy.nc.gz']);
nc_dump([pwd '/jb_ibn_srn_gtn_giy.nc'])                      6
```

```
%% 2 steps, get data, make a plot
%% Step 1, get data                                                    4
% TODO: Change this to your own path
f = 'jb_ibn_srn_gtn_giy.nc';
% From file f, get variable height, starting at t=0,
    lat=0,lon=0, get 1
% timestep, and all lat and lon
h = nc_varget(f, 'height', [0,0,0], [1,-1,-1]);                        9
% Get the whole time vector
t = nc_varget(f, 'time');
% Transform them into matlab dates
dates = datenum('1990-1-1') + double(t);
% Get the lats                                                        14
lat = nc_varget(f, 'lat');
% Get the lons
lon = nc_varget(f, 'lon');
```

```
% Make them into two matrices (matlab doesn't get
    vectors for
% coordinates....)
[Lat, Lon] = meshgrid(lat,lon);

% Load some topography data (from matlab)
load topo

% Use a globe
grs80 = almanac('earth','grs80','km');
domeRadius =  3000;   % km
domeLat =  39;        % degrees
domeLon = -77;        % degrees
domeAlt = 0;          % km
```

```
%% Part 2 the plotting
% Use 3d rendering
figure('Renderer','opengl')
% Set the globe as an axis
ax = axesm('globe','Geoid',grs80,'Grid','on', ...
    'GLineWidth',1,'GLineStyle','-',...
    'Gcolor',[0.9 0.9 0.9],'Galtitude',100);
% Not sure what this does....
set(ax,'Position',[0 0 1 1]);
% Hide the axes.
axis equal off
% Look from the default 3d view
view(3)
% I want a black background, If I ask for black I get
   dark grey, at least
% it is an improvement....
colordef black
```

```
% Show the areas
geoshow('landareas.shp', 'FaceColor', 'black');
% Put the plot here on the lower left, 800x600px
set(gcf, 'Position', [0 0 800 600])
% Not sure what this is, but it shines...
material ([.7, .9, .8])
% Let's keep looking at the same spot so remember
    where we look at.
obj = camtarget;
% All these things are set to auto by default, which
    gives an animation
% which requires in epileptic risk warning.
campos('manual')
camva('manual')
camtarget('manual')
camzoom(1.5)
```

```
%% This is the animation part                                    1
nt = (length(t)-1);
% Let's scale it up so we can make it look more 2012
    like....
scale = 4;
for i=0:nt
    % get data for the next timestep                             6
    h = nc_varget(f, 'height', [i,0,0], [1,-1,-1]);
    % Plot a new surface
    handle = geoshow(Lat, Lon, h'*scale,'DisplayType',
        'surface');
    % clim([-300,300]*scale);
    set(gca, 'Clim', [-300,300]*scale);                          11
    % Let's show a colorbar because we scaled things
        up a bit
    cbh = colorbar('location', 'southoutside', '
        Position' ,[0.2 0.1 0.6 0.0595]);
```

```
% Downscale the labels
set(cbh, 'XTickLabel', num2str(str2num(get(cbh, '
    XTickLabel'))/scale))
% Move around the earth a bit
camorbit(5, 0)
% Show some light from the right.
camh = camlight('right');
% This makes it shine more
lighting phong;
% Show the date at the north Pole
texth = text(0,0,8000,datestr(dates(i+1)), 'Color'
    , 'white');
% Store this frame
F(i+1) = getframe(gcf);
% Delete all the parts, for the next timestep
delete(cbh);
delete(handle);
delete(texth);
delete(camh);
```

```
end
%% Now play or store the movie....
% movie(F, 5)
% movie2avi(F,'mlanimation.avi', 'compression', 'None
    ')
```


Assignment

1. Use the function "regress" to estimate sea level rise.
2. Improve the animation
3. Analyse the spectrum using one of the "spectrum.estmethod" functions.