# Analysis_of_Uncertainty

May 25, 2017

0.0.1 P A R s

```
In [18]: WDIR = '~/git/seminars/Siti_Contaminati/';
         load( fullfile(WDIR,'geotables.mat'), 'T' )

In [42]: % ____Geostatistical Conditional Simulation____
         %   <L1>
         ChEl        = 'Chrome';
         NSIM        = 200;
         opt         = strcat( 'empty2NaN' );
         L           = 1;% for loop on L = 1:3 !!
         gcs.L       = greadtext( fullfile(WDIR,['L',num2str(L),'_gcs_raw.txt']), ',', '', '"',

In [43]: Easting     = cae(gcs.L,1);
         Northing    = cae(gcs.L,2);
         gcssim      = 1;% for loop on gcssim = 1:NSIM
         %eval( ['GCSMAP = cell2mat(gcs.L',num2str(L),'(2:end,2+gcssim));'] )% +2 :: ~Easting+No
         GCSMAP      = cae(gcs.L,2+gcssim);

         SIMs        = cae(gcs.L,3:NSIM+2);

In [53]: xylabfs = 12;
         %% --------- spread on GCS maps
         MED = median(SIMs,2);
         MEA = mean(SIMs,2);
         STD = std(SIMs,[],2);
         SumSim = sum( SIMs, 2 );

         % S C A T T E R
         MAP2PLOT = STD;
         Idepths = (T(1).xrf_limsup + T(1).xrf_liminf) / 2;
         Zm = zeros(size(GCSMAP)) + Idepths(L);
         figure
         % scatter3( Easting, Northing, -Zm(:), SumSim,SumSim, 'filled' )
         scatter3( Easting, Northing, -Zm(:), MAP2PLOT,MAP2PLOT, 'filled' )
         colormap(cool(32)), colorbar
         title(['\fontsize{18}\color{red}XRF \color{black}[\color{magenta}',ChEl,...
                '\color{black}]\fontsize{10}_{L',num2str(L),'}'],'FontWeight','b','FontSize',22)
```

```
xlabel('Easting [m]','FontWeight','b','FontSize',xylabfs),
ylabel('Northing [m]','FontWeight','b','FontSize',xylabfs),
zlabel('Depth [mm]','FontWeight','b','FontSize',xylabfs)
view(2),axis equal
```
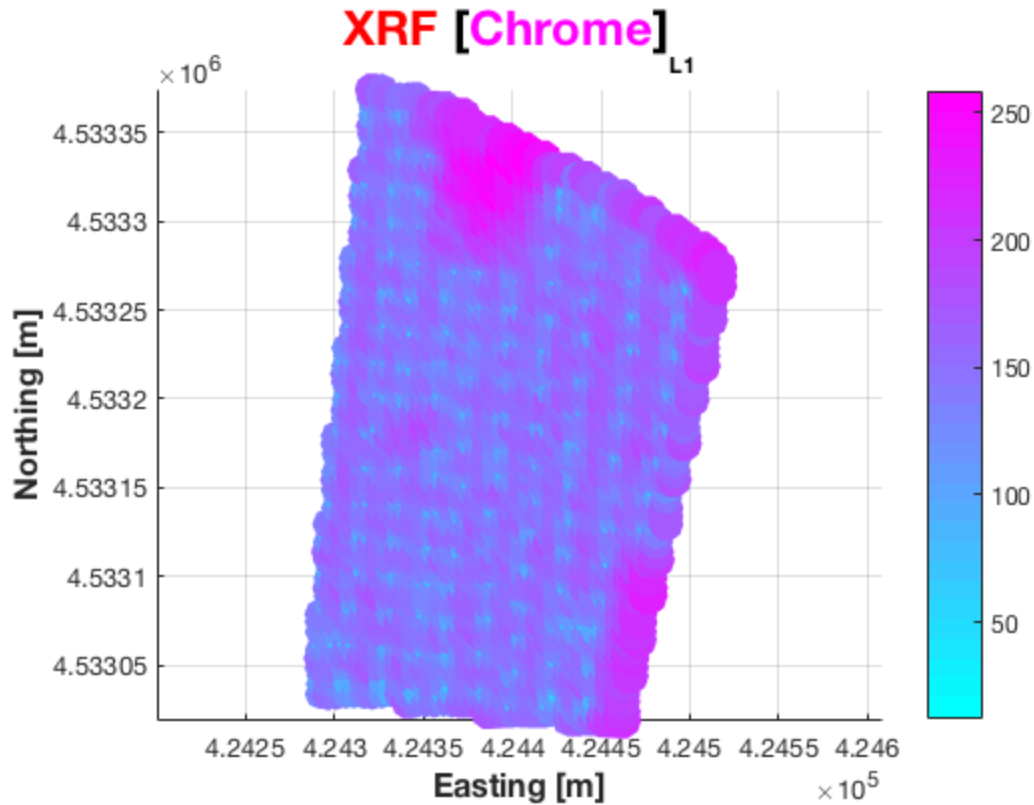
In [50]:
```
%% --------- Probability distribution function
%% ----------- ___PIXEL___
% ____pars_____
THRESHOLD = 350;
ROW = [12,1492,1977];
% ____pars_____
pixel = SIMs(ROW,1:100);
figure(6),clf,plot(sort(pixel,2,'descend'),1:100, 'LineWidth',2)
% cAX = axis; cAX(1)=0; axis(cAX);
cAX=axis;
title('Probability distribution functions of 3 random pixels')
ylabel('Probability, %')
xlabel( [ChEl,' concentration [ppm]'] )

hold on, line([THRESHOLD,THRESHOLD],[0,100],'LineStyle','-.','color','k'), hold off
```
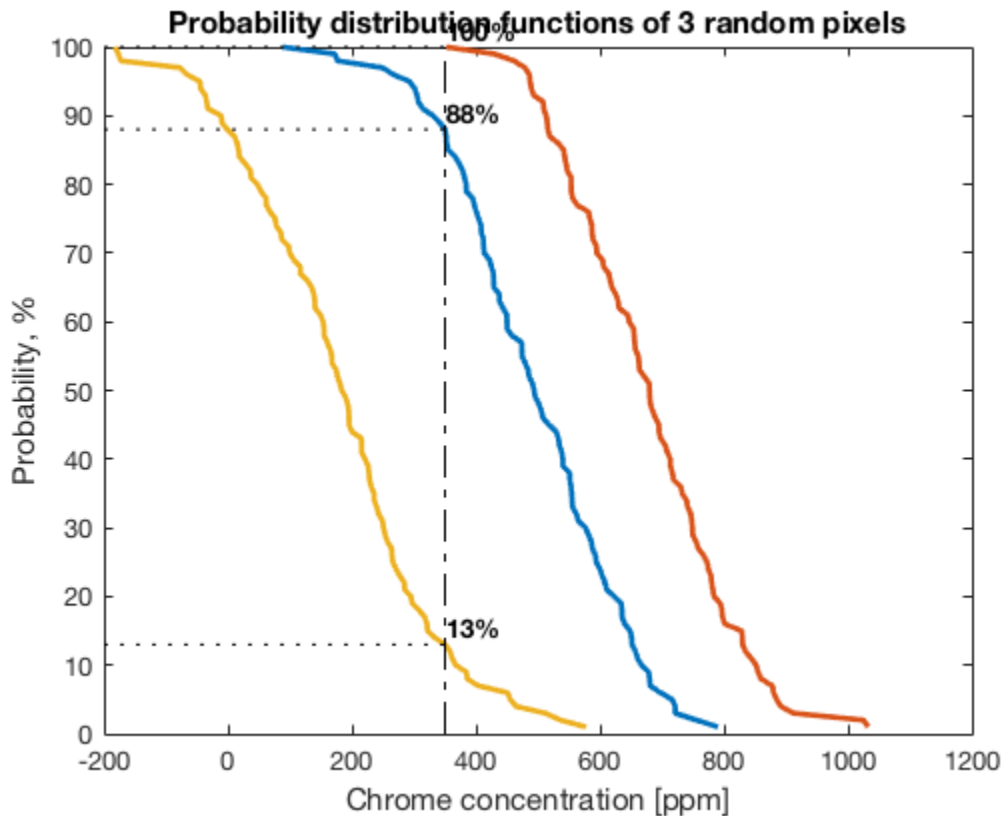
```matlab
Pr = sum(pixel>=THRESHOLD,2) / size(pixel,2) * 100;
% hold on, line(repmat([cAX(1),THRESHOLD],3,1),[Pr,Pr],'color','k'), hold off
hold on
for ii = 1:numel(ROW)
    if Pr(ii)==0, continue, end
    line([cAX(1),THRESHOLD],[Pr(ii),Pr(ii)],'LineStyle',':','color','k')
    text(THRESHOLD,Pr(ii),[num2str(Pr(ii)),'%'],'HorizontalAlignment','left','VerticalA
end
hold off
```

Probability distribution functions of 3 random pixels

```matlab
%% ----------- ___MAP___
% ____pars_____
THRESHOLD = 350;
% ____pars_____
Pr = sum(SIMs>=THRESHOLD,2) / size(SIMs,2) * 100;

% S C A T T E R
MAP2PLOT = Pr;
Idepths = (T(1).xrf_limsup + T(1).xrf_liminf) / 2;
Zm = zeros(size(GCSMAP)) + Idepths(L);
figure(9)
```

3

```matlab
% scatter3( Easting, Northing, -Zm(:), SumSim,SumSim, 'filled' )
scatter3( Easting, Northing, -Zm(:), MAP2PLOT+0.1,MAP2PLOT, 'filled' )
colormap(cool(32)), colorbar
title(['\fontsize{18}\color{red}XRF \color{black}[\color{magenta}',ChEl,...
       '\color{black}]\fontsize{10}_{Probability Distribution}'],'FontWeight','b','Font
xlabel('Easting [m]','FontWeight','b','FontSize',xylabfs),
ylabel('Northing [m]','FontWeight','b','FontSize',xylabfs),
zlabel('Depth [mm]','FontWeight','b','FontSize',xylabfs)
view(2),axis equal
```