SCRIPT

```
% save('salmonhole.mat', 'SALMONHOLE')

format shortG;
getdata = load('salmonhole.mat');
data = getdata.SALMONHOLE;
year = data(:, 1);
month = data(:, 2);



%Year and Month
[ym, ~, ymidx] = unique([year month], 'rows');
maxym = [ym, accumarray(ymidx, data(:, 4), [], @nanmax)];
minym = [ym, accumarray(ymidx, data(:, 5), [], @nanmin)];
meanym = [ym, accumarray(ymidx, data(:, 6), [], @nanmean)];



%Table Year and Month
tableym = table(maxym(:, 1), maxym(:, 2), maxym(:, 3),  minym(:, 3), meanym(:, 3),
'VariableNames', {'Year', 'Month', 'Maximum', 'Minimum', 'Mean'});
fprintf('Mean (average), Minimum and Maximum per Month Between 1941 and 2010 (?C) \n')
disp(tableym);

%Month
[m, ~, midx] = unique(month, 'rows');

for i = 1:3     % i = 1:3 (1 = max, 2 = min, 3 = mean)
   mean12{i} = [m, accumarray(midx, data(:, i+3), [], @nanmean)];
   max12{i} = [m, accumarray(midx, data(:, i+3), [], @nanmax)];
   min12{i} = [m, accumarray(midx, data(:, i+3), [], @nanmin)];
   median12{i} = [m, accumarray(midx, data(:, i+3), [], @nanmedian)];
   mode12{i} = [m, accumarray(midx, data(:, i+3), [], @mode)];
   std12{i} = [m, accumarray(midx, data(:, i+3), [], @nanstd)];
end

%Tables Month
m_name = {'January', 'February', 'March', 'April', 'May', 'June', 'July', ...
   'August', 'September', 'October', 'November', 'December'};

t_max = table(mean12{1}(:, 2), max12{1}(:, 2), min12{1}(:, 2),...
   median12{1}(:, 2), mode12{1}(:, 2), std12{1}(:, 2),...
   'RowNames', m_name, 'VariableNames', {'Average', 'Maximum', 'Minimum', 'Median', 'Mode',
'Std'});
fprintf('        Maximum Temperature (C)\n')
disp(t_max)

t_min = table(mean12{2}(:, 2), max12{2}(:, 2), min12{2}(:, 2),...
   median12{2}(:, 2), mode12{2}(:, 2), std12{2}(:, 2),...
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   'RowNames', m_name, 'VariableNames', {'Average', 'Maximum', 'Minimum', 'Median', 'Mode',
'Std'});
fprintf('        Minimum Temperature (C)\n')
disp(t_min)

t_mean = table(mean12{3}(:, 2), max12{3}(:, 2), min12{3}(:, 2),...
   median12{3}(:, 2), mode12{3}(:, 2), std12{3}(:, 2),...
   'RowNames', m_name, 'VariableNames', {'Average', 'Maximum', 'Minimum', 'Median', 'Mode',
'Std'});
fprintf('        Mean Temperature (C)\n')
disp(t_mean)

%Plot Mean, Min and Max
[n, m] = size(ym);
nm = linspace(1,n,n);   %number of months
yxaxis = zeros(1,n);
max12 = [ym, accumarray(ymidx, data(:, 4), [], @nanmean)];
min12 = [ym, accumarray(ymidx, data(:, 5), [], @nanmean)];
plot3 = [meanym(:, 1) meanym(:, 2) meanym(:, 3) max12(:, 3) min12(:, 3)];
titlefig1 = {'Mean (Average) per Month (January 1941 to December 2010)', 'Extreme Minimum
per Month (January 1941 to December 2010)', 'Extreme Maximum per Month (January 1941 to
December 2010)'};
labelyfig1 = {'Mean (Average per month, C)', 'Extreme Minimum (C)', 'Extreme Maximum (C)'};

for i = 1:3
   figure(1)
   subplot(3, 1, i)
   plot(nm, plot3(:, 2+i), '-')
   hold on
   xlim([0, n])
   title(titlefig1(i))
   ylabel(labelyfig1(i))
   xlabel('Months from the beginning of the data')
   grid on
   grid minor
   hold off
end

%Plot Months
[~, ~, m12] = unique(maxym(:, 2), 'rows');
meansp = accumarray(m12, 1:size(meanym, 1), [], @(a){meanym(a, :)});
maxsp = accumarray(m12, 1:size(maxym, 1), [], @(a){maxym(a, :)});
minsp = accumarray(m12, 1:size(minym, 1), [], @(a){minym(a, :)});

for i = 1:12
   meansp{i} = sortrows(meansp{i}, 1);      %Mean T
   maxsp{i} = sortrows(maxsp{i}, 1);    %Max T
   minsp{i} = sortrows(minsp{i}, 1);    %Min T
end

for i = 1:12
```
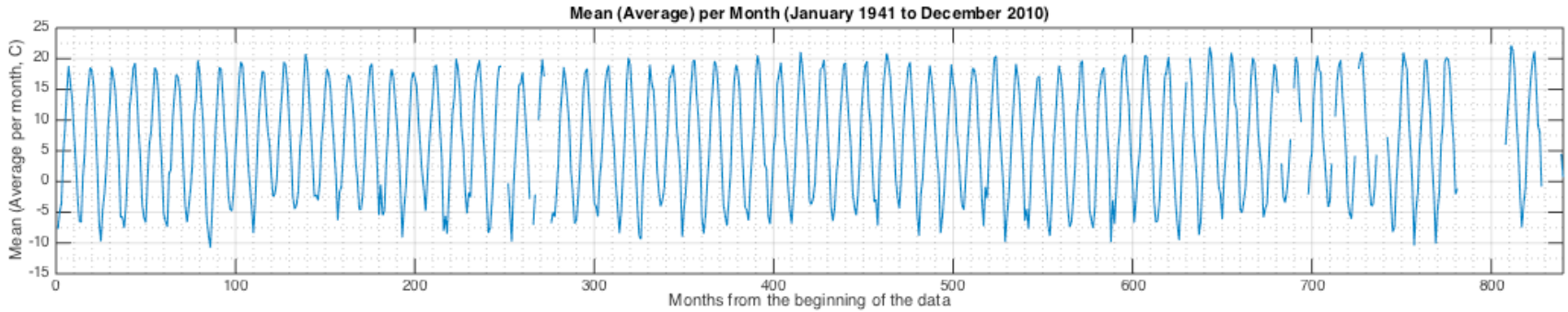
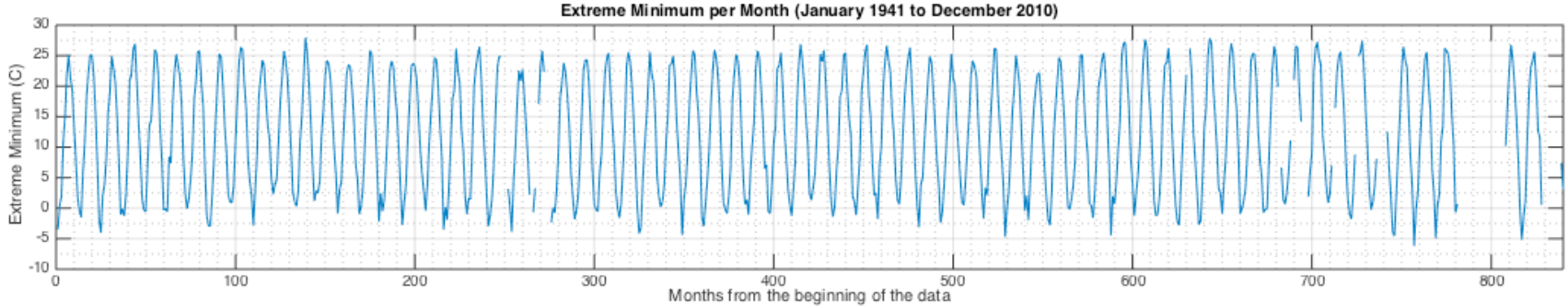
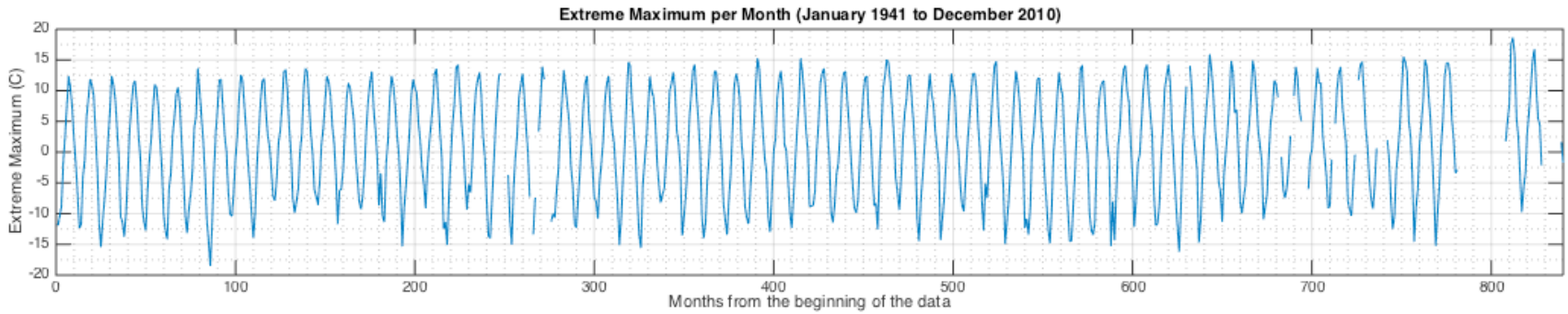
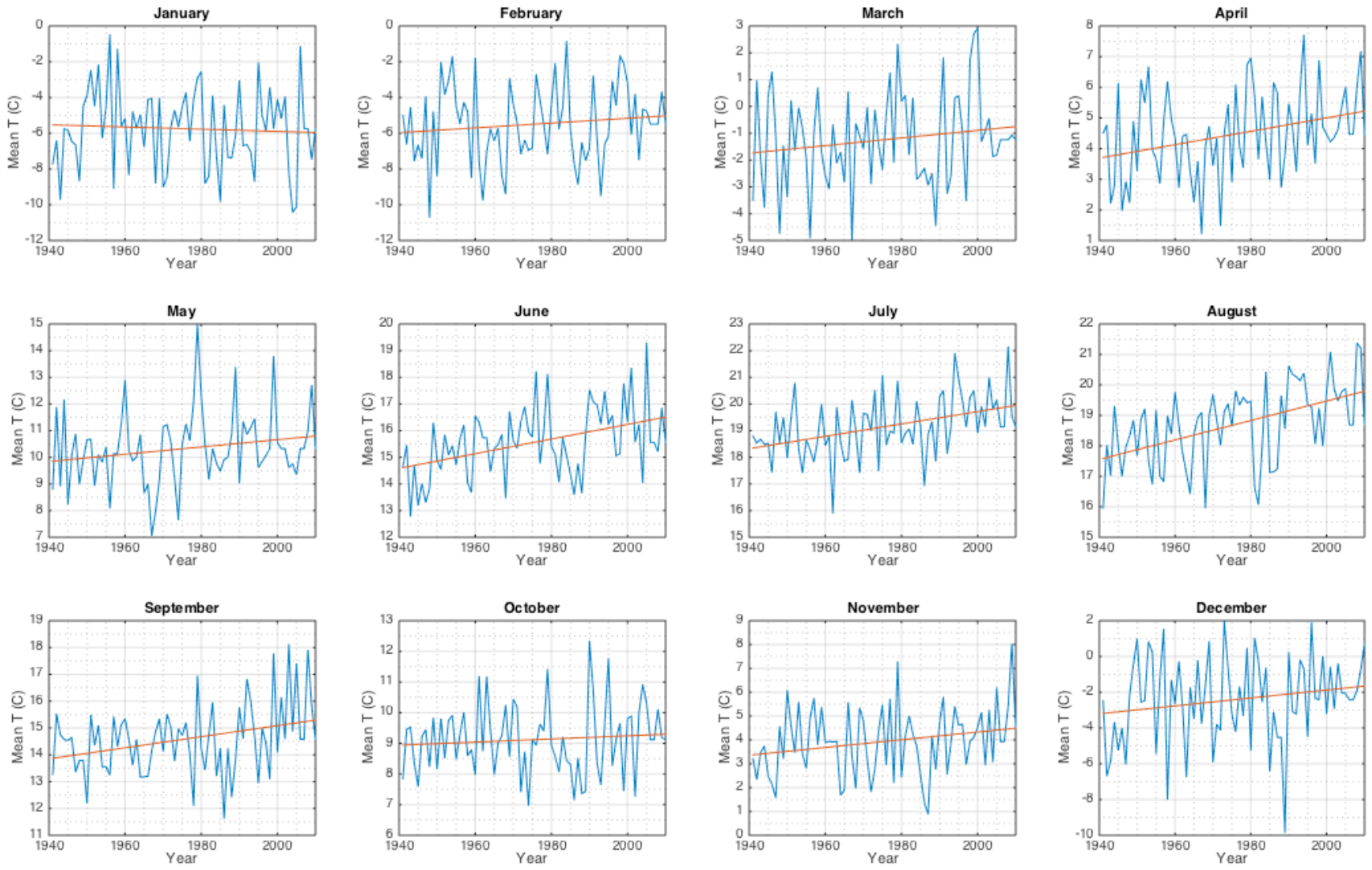

```
   avemeansp{i} = nanmean(meansp{i}(:, 3));
   avemaxsp{i} = nanmean(maxsp{i}(:, 3));
   aveminsp{i} = nanmean(minsp{i}(:, 3));
end

[n, m] = size(meansp{1});

for i = 1:n
   for j = 1:12
      for k = 1:12
         if isnan(meansp{k}(i, 3))
            meansp{k}(i, 3) = avemeansp{k}(1, j);
         end
         if isnan(maxsp{k}(i, 3))
            maxsp{k}(i, 3) = avemaxsp{k}(1, j);
         end
         if isnan(minsp{k}(i, 3))
            minsp{k}(i, 3) = aveminsp{k}(1, j);
         end
      end
   end
end


lmean = zeros(12, 2);      %Mean T
lmax = zeros(12, 2);      %Max T
lmin = zeros(12, 2);     %Min T
linesmean = zeros(12, 70);      %Mean T
linesmax = zeros(12, 70);      %Max T
linesmin = zeros(12, 70);     %Min T

%%getting indices where y is valid (not NaN)

for i = 1:12
   lmean(i, :) = polyfit(meansp{i}(:, 1), meansp{i}(:, 3), 1);
   linesmean(i, :) = polyval(lmean(i, :), 1941:2010);
   lmax(i, :) = polyfit(maxsp{i}(:, 1), maxsp{i}(:, 3), 1);
   linesmax(i, :) = polyval(lmax(i, :), 1941:2010);
   lmin(i, :) = polyfit(minsp{i}(:, 1), minsp{i}(:, 3), 1);
   linesmin(i, :) = polyval(lmin(i, :), 1941:2010);
end

% Plot Mean
for i = 1:12
   figure(2)
   subplot(3, 4, i)
   plot(1941:2010, meansp{i}(:, 3))
   hold on
   plot(1941:2010, linesmean(i, :))
   title(m_name{i})
   xlim([1940 2010])
```

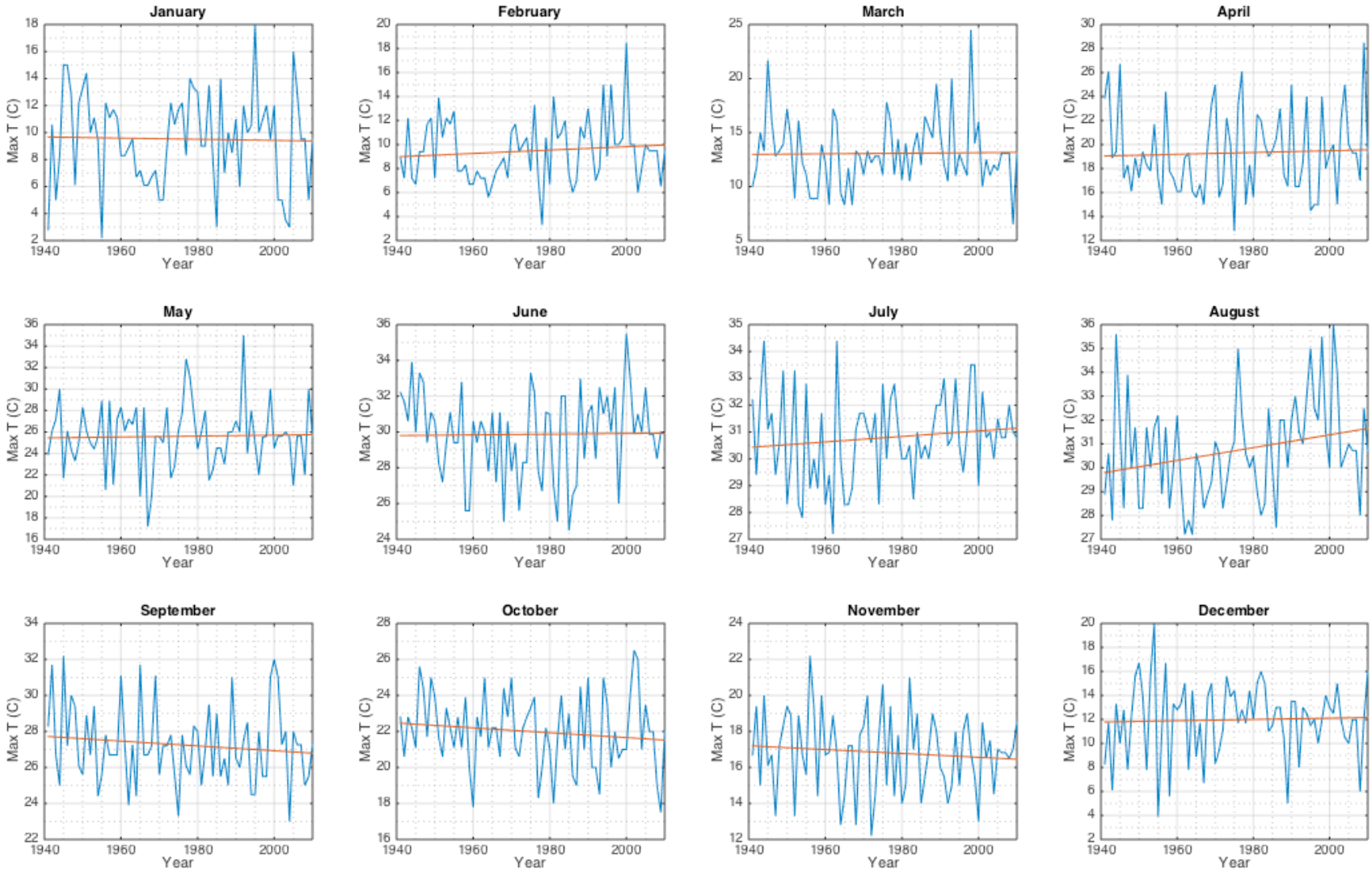
```
    xlabel('Year')
    ylabel('Mean T (C)')
    grid on
    grid minor
    hold off
end

% Plot Max
for i = 1:12
    figure(3)
    subplot(3, 4, i)
    plot(1941:2010, maxsp{i}(:, 3))
    hold on
    plot(1941:2010, linesmax(i, :))
    title(m_name{i})
    xlim([1940 2010])
    xlabel('Year')
    ylabel('Max T (C)')
    grid on
    grid minor
    hold off
end

% Plot Min
for i = 1:12
    figure(4)
    subplot(3, 4, i)
    plot(1941:2010, minsp{i}(:, 3))
    hold on
    plot(1941:2010, linesmin(i, :))
    title(m_name{i})
    xlim([1940 2010])
    xlabel('Year')
    ylabel('Min T (C)')
    grid on
    grid minor
    hold off
end
```

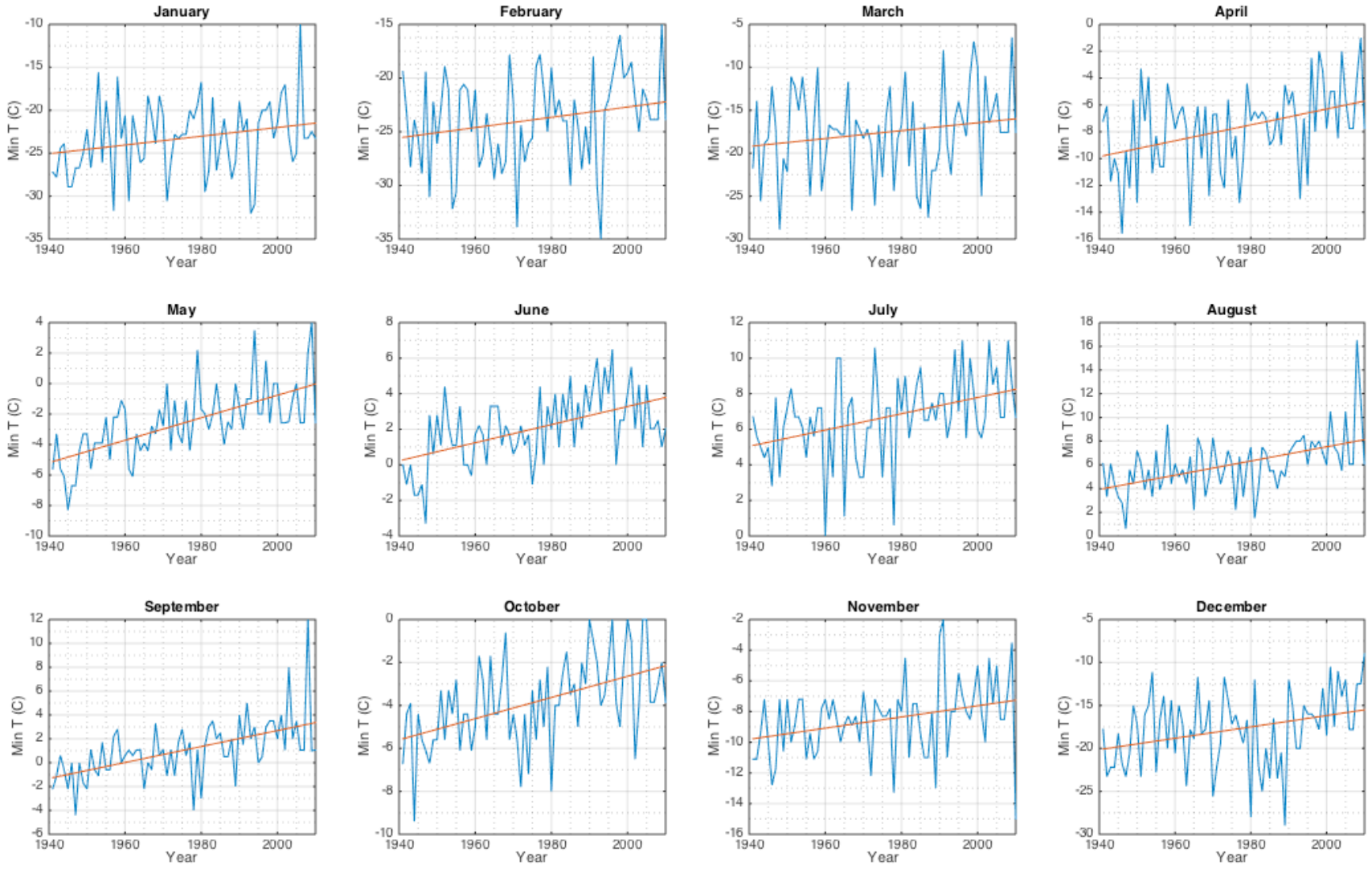

Mean (Average) per Month (January 1941 to December 2010)
Mean (Average per month, C)
Months from the beginning of the data


Extreme Minimum per Month (January 1941 to December 2010)
Extreme Minimum (C)
Months from the beginning of the data


Extreme Maximum per Month (January 1941 to December 2010)
Extreme Maximum (C)
Months from the beginning of the data


January
February
March
April
May
June
July
August
September
October
November
December
Mean T (C)
Year
1940
1960
1980
2000


January
February
March
April
May
June
July
August
September
October
November
December
Max T (C)
Year


January
February
March
April
May
June
July
August
September
October
November
December
Min T (C)
Year
1940
1960
1980
2000

SAMPLE

Note: Sample not showing tableym

Maximum Temperature (C)

	Average	Maximum	Minimum	Median	Mode	Std
January	-0.7189	18	-19	-0.5	0	5.8318
February	-0.10027	18.5	-20	0	0	5.3456
March	3.7638	24.5	-16.7	3.5	5	4.7649
April	9.6296	28.5	-7	9.4	10	4.7624
May	16.571	35	0	16.1	15	5.0096
June	22.144	35.5	5.6	22.2	20	4.5442
July	25.265	34.4	12.8	25.5	25	3.2446
August	24.68	36	11.7	25	25	3.4732
September	20.366	32.2	7.5	20.5	20	3.7825
October	14.396	26.5	-0.6	14.4	15	4.2435
November	8.1628	22.2	-5	7.8	5	4.8275
December	1.8488	20	-16.1	1.7	0	5.5769

Minimum Temperature (C)

	Average	Maximum	Minimum	Median	Mode	Std
January	-10.762	8.5	-32	-10.6	-10	7.1185
February	-10.843	7.8	-35	-10	-10	7.2635
March	-6.2336	8.9	-28.9	-5.5	0	5.8852
April	-0.73522	12.2	-15.6	-0.6	0	3.794
May	4.0389	16.1	-8.3	4	5	3.8287
June	8.932	21.1	-3.3	9	10	3.8386
July	12.977	23.3	0	13.3	15	3.3325
August	12.651	23.3	0.6	12.8	15	3.747
September	8.7301	21	-4.4	8.9	5	4.5606
October	3.795	19.4	-9.4	3.5	0	4.4727
November	-0.30607	15	-15	-0.6	0	4.6444
December	-6.6587	11.1	-29	-6	0	6.3607

Mean Temperature (C)

	Average	Maximum	Minimum	Median	Mode	Std
January	-5.7483	11	-23.5	-5.6	0	5.8306
February	-5.4798	10.3	-25	-5.3	-5	5.6757
March	-1.2405	16.3	-19.2	-0.9	0	4.7039
April	4.4658	17.5	-7.3	4.5	5	3.5963
May	10.327	22.2	-0.6	10	7.8	3.7199
June	15.561	26.7	4.2	15.55	14.5	3.5957
July	19.146	27.2	8.9	19.2	20.3	2.6802
August	18.689	27.3	8.9	18.7	17.5	2.9836
September	14.574	24.2	3.4	14.5	15	3.6241
October	9.1184	20.3	-2.2	9	10	3.8037
November	3.9422	17	-9	3.6	2.5	4.2635
December	-2.4076	13.9	-18.9	-2.2	0	5.4052

CLIMATE CHANGE

Slope for Each Months (1941 to 2010)

Month	Mean T	Extreme Max T	Extreme Min T
January	-0.0062301	-0.0042069	0.050931
February	0.013391	0.014075	0.047839
March	0.014226	0.0026992	0.045952
April	0.021849	0.0074033	0.059123
May	0.013653	0.0043671	0.073775
June	0.027482	0.0018804	0.050859
July	0.023205	0.010266	0.04578
August	0.031963	0.026804	0.059976
September	0.020628	-0.013381	0.066892
October	0.0051051	-0.013563	0.049347
November	0.016188	-0.010737	0.036451
December	0.022155	0.0055334	0.066132