

```
<<Utilities`BinaryFiles`
<<Statistics`DataManipulation`
<<Statistics`ContinuousDistributions`
```

```
Needs["ExtendGraphics`LabelContour`"]
```

Syntax::com :

警告: 引き続き式がないのにコンマが見付かりました。式はNullとして扱われます。 (line 525 of "ExtendGraphics`LabelContour` ") [詳細](#)

```
myDirectory="/Volumes/PBG4/LaCie Backup/NDVI2000";
SetDirectory[myDirectory];
```

```
array = Table[Byte, {3600}, {3600}];
```

```
Show[Graphics[RasterArray[{Table[Hue[0.4*i,1,1-0.56*i],{i,0,1,0.1}]}],{{0,0},{1,1}}],Aspect
Ratio->.1];
```



■ calculate mean and std value of NDVI

```
ratio=120/300.
```

```
0.4
```

```
data = Table[ndviFile=
```

```
  "2000-ndvi.raw/00" <> If[i < 10, "0" <> ToString[i], ToString[i]] <> "-ndvi.raw";
```

```
  sbyte = OpenRead[ndviFile];
```

```
  a = Read[sbyte, array];
```

```
  Close[sbyte];
```

```
  a1 = Reverse[a];
```

```
  b = Take[a1, {2401, 3600, 10}];
```

```
  b1 = Transpose[b];
```

```
  b2 = Take[b1, {1, 3000, 10}];
```

```
  c = Transpose[b2]
```

```
, {i, 1, 12}];
```

```
meanNDVI = Plus@@ data / 12;
```

```
stdNDVI = Sqrt[Apply[Plus, Map[(# - meanNDVI)^2 &, data]] / 12] // N;
```

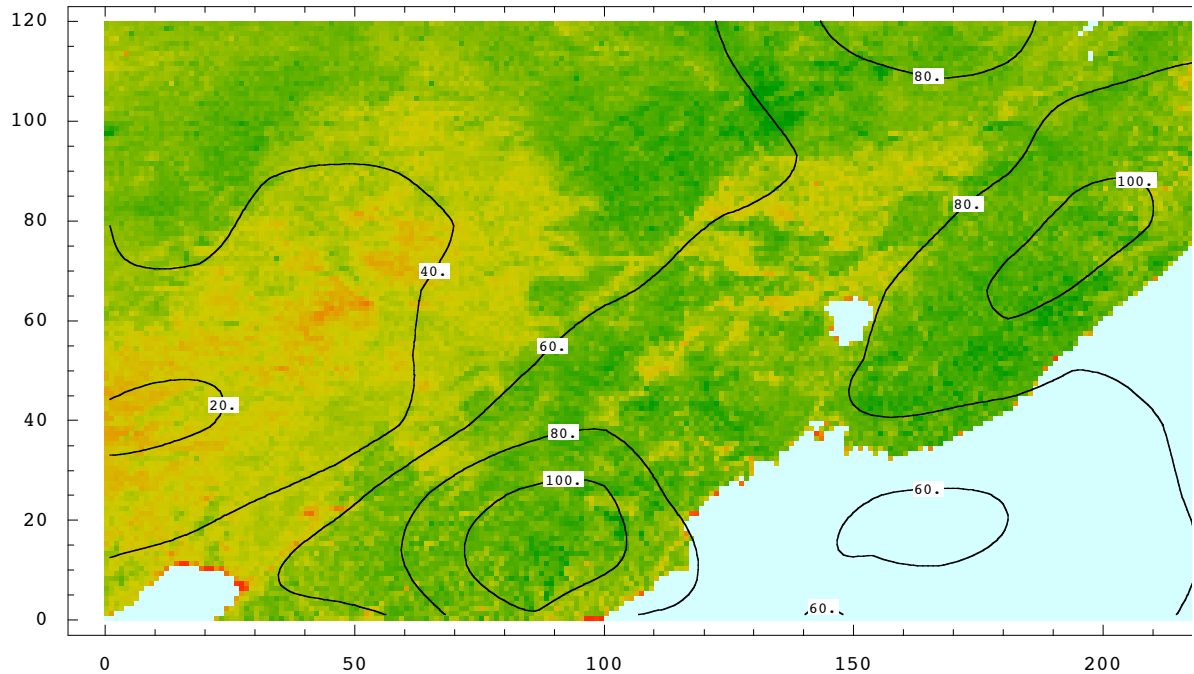
```
Max[meanNDVI] // N
```

```
145.917
```

```

gmean = ListDensityPlot[meanNDVI, Mesh → False,
  PlotRange → {105, 150}, DisplayFunction → Identity, ColorFunction →
    (If[# == 0, Hue[0.5, 0.2, 1], Hue[.4*#, 1, 1 - 1.4*.4*#]] &), AspectRatio → ratio];
Show[gmean, gprep, PlotRange → All, DisplayFunction → $DisplayFunction];

```



```
Dimensions[meanNDVI]
```

```
{120, 300}
```

```
{{長春, 43.52, 125.2}, {瀋陽, 41.47, 123.24}, {哈爾濱, 45.45, 126.38}}
```

```
{{長春, 43.9, 125.}, {瀋陽, 41.8, 123.4}, {哈爾濱, 45.75, 126.6}}
```

■ Classification of area with meanNDVI/stdNDVI combinations

```
meanSh = 130; stdSh = 15;
```

```
clsmap = MapThread[Which[#1 == 0, 0,
```

```
  #1 ≤ (meanSh - 10) && #2 ≤ stdSh, 0.01,
```

```
  #1 ≤ meanSh && #2 ≤ stdSh, 0.1,
```

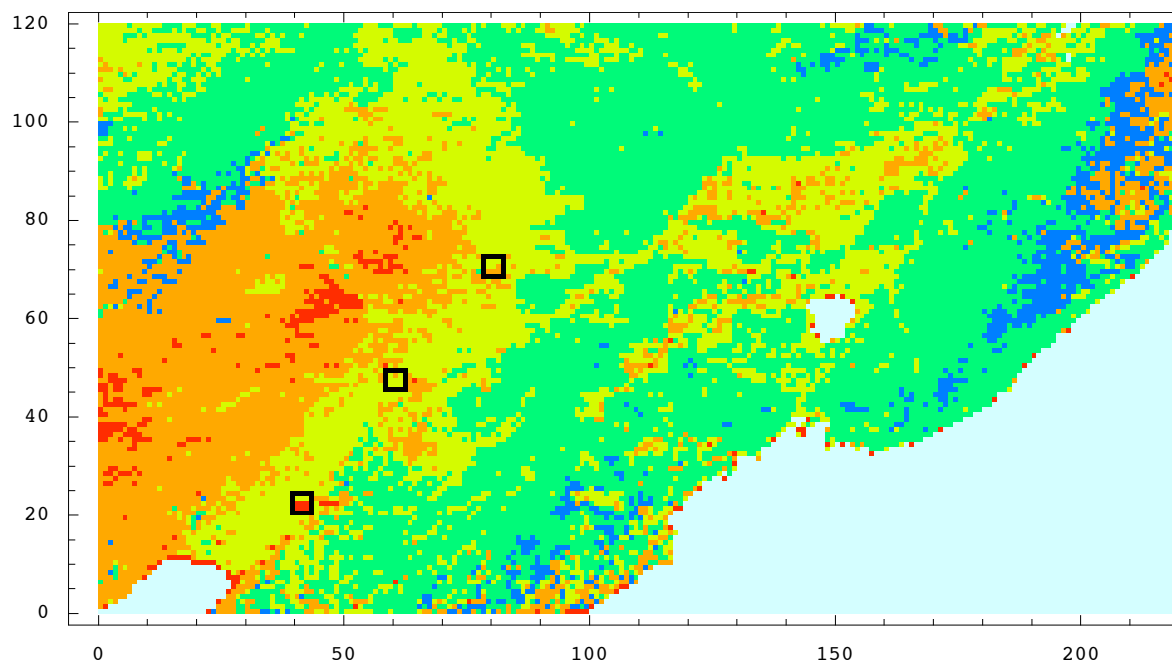
```
  #1 ≤ meanSh && #2 > stdSh, 0.2,
```

```
  #1 > meanSh && #2 ≤ stdSh, 0.6,
```

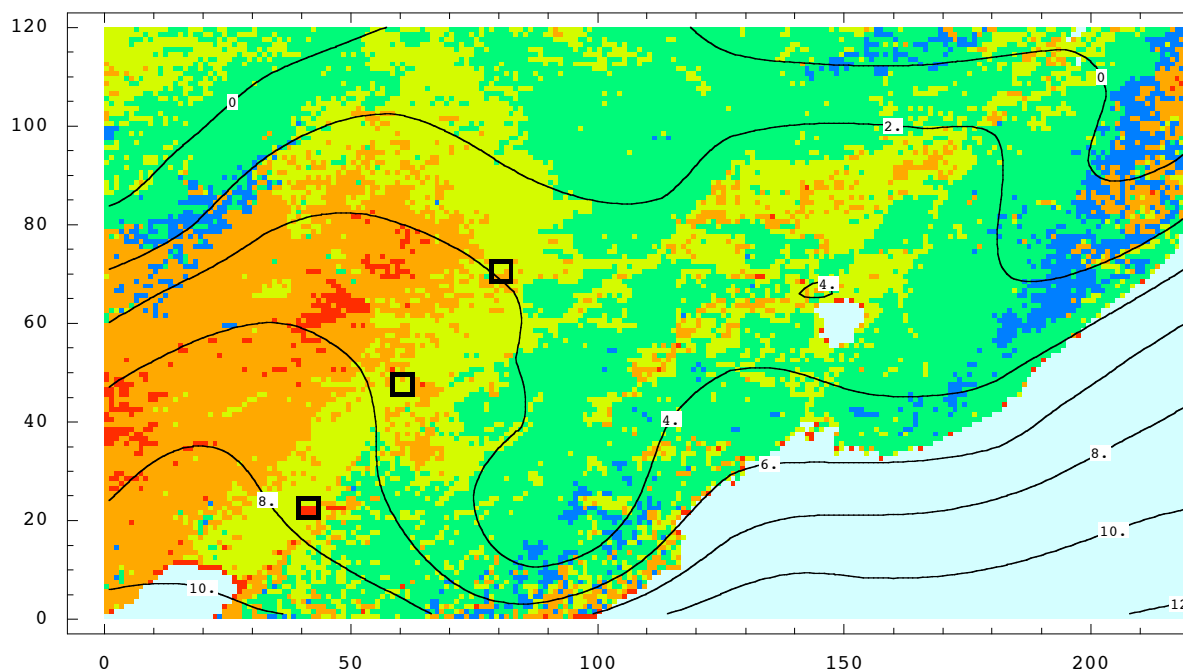
```
  #1 > meanSh && #2 > stdSh, 0.4] &,
```

```
{meanNDVI, stdNDVI}, 2];
```

```
gclsmap= ListDensityPlot[xref, Mesh→ False,
  ColorFunction→ (If[# == 0, Hue[0.5, 0.2, 1], If[# == 1, Hue[0, 0, 0], Hue[#]]] &),
  PlotRange→ {0, 1}, AspectRatio→ ratio];
```



```
Show[gclsmap, gtemp, PlotRange→ All];
```



```

box[p_] := (
  xl = p[[1]][[1]]; xr = p[[1]][[2]]; yb = p[[2]][[1]]; yt = p[[2]][[2]];
  lcolor = 1;
  bottom = ReplacePart[xref[[yb]], lcolor, Table[{i}, {i, xl, xr}]];
  top = ReplacePart[xref[[yt]], lcolor, Table[{i}, {i, xl, xr}]];
  xref = ReplacePart[ReplacePart[xref, bottom, yb], top, yt];
  yref = Transpose[xref];
  right = ReplacePart[yref[[xr]], lcolor, Table[{i}, {i, yb, yt}]];
  left = ReplacePart[yref[[xl]], lcolor, Table[{i}, {i, yb, yt}]];
  Transpose[ReplacePart[ReplacePart[yref, right, xr], left, xl]])

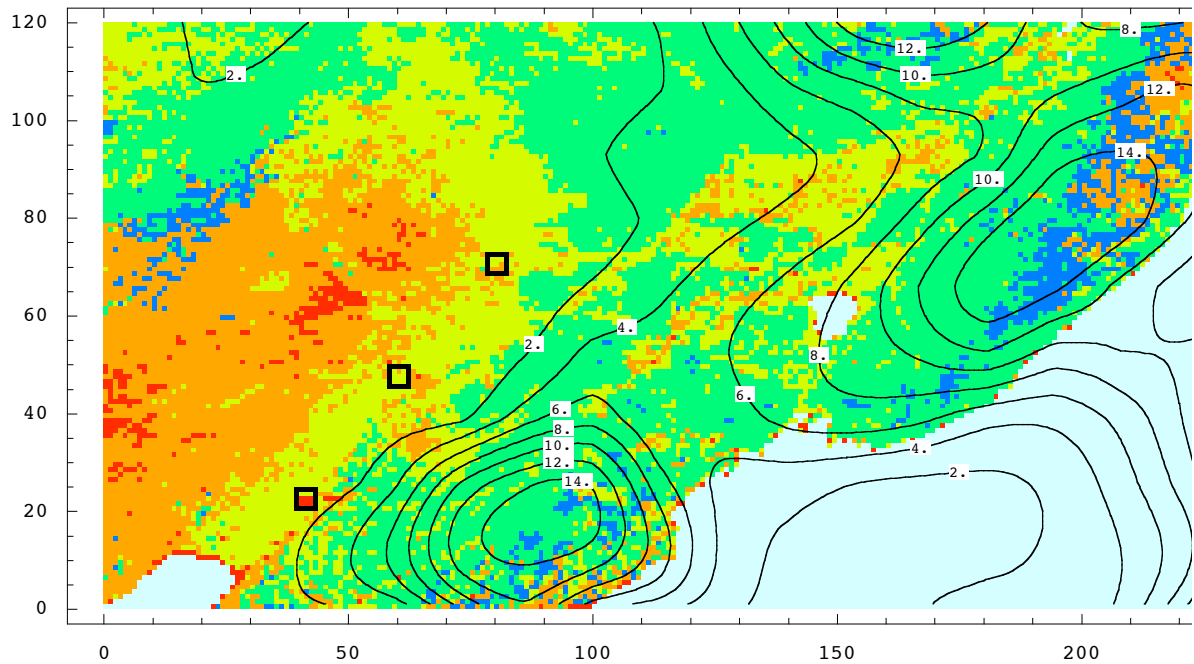
latlon2N[lat_, lon_] :=
  {Ceiling[(lat - 40)/(50. - 40.) * 120] + 1, Ceiling[(lon - 120)/(145. - 120.) * 300] + 1}

makeBox[pos_] := Reverse[Transpose[{pos - 2, pos + 2}]];

xref = clsmmap;
sapporo = makeBox[latlon2N[43.0, 141.3]];
tyoushun = makeBox[latlon2N[43.9, 125.]];
shinyo = makeBox[latlon2N[41.8, 123.4]];
harupin = makeBox[latlon2N[45.75, 126.6]];
xref = box[tyoushun];
xref = box[shinyo];
xref = box[harupin];
xref = box[sapporo];

Show[gclsmmap, gprep, PlotRange -> All];

```



```
{Max[stdNDVI], Min[stdNDVI]}
```

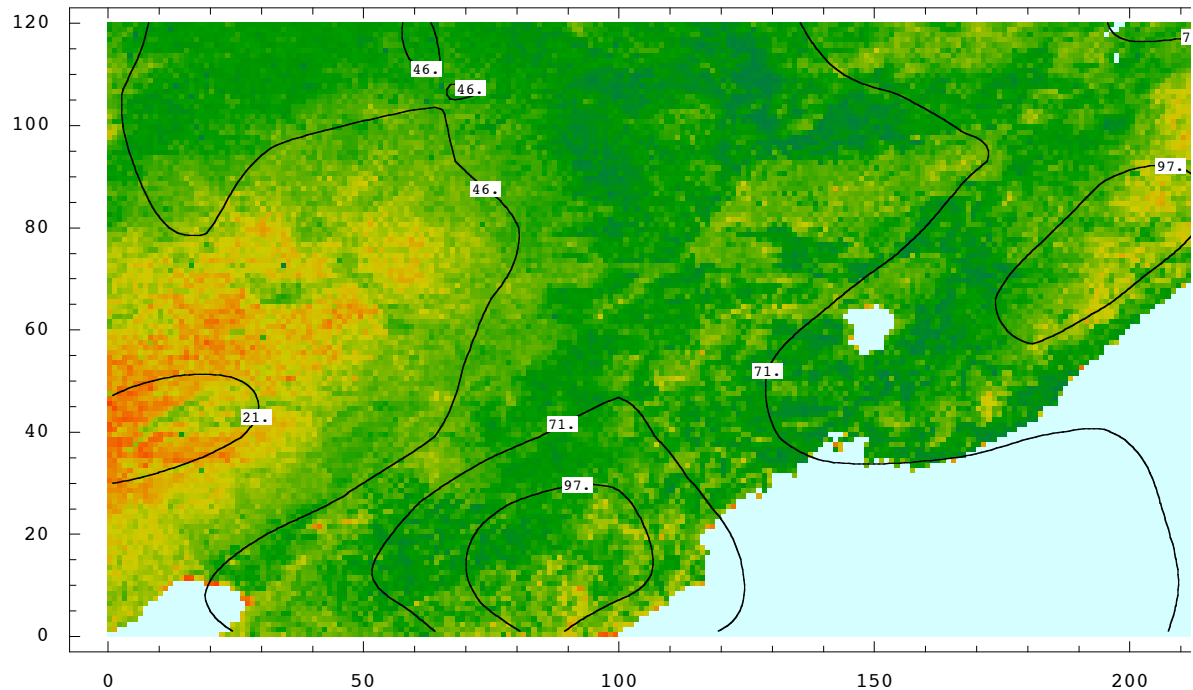
```
{42.7265, 0.}
```

```
gstd = ListDensityPlot[stdNDVI, Mesh → False,
```

```
PlotRange → {0, 25}, DisplayFunction → Identity, ColorFunction →
```

```
(If[# == 0, Hue[0.5, 0.2, 1], Hue[.4*#, 1, 1 - 1.4*.4*#]] &), AspectRatio → ratio];
```

```
Show[gstd, gprep, PlotRange → All, DisplayFunction → $DisplayFunction];
```



```
sfstmp = ReadListBinary["sfc2temp/2000_sfc2t", Single];
```

```
sfstmean = Partition[sfstmp, 24];
```

```
latitude = {39.8129, 40.9343, 42.0558, 43.1773,
```

```
44.2988, 45.4203, 46.5418, 47.6632, 48.7847, 49.9062, 51.0277};
```

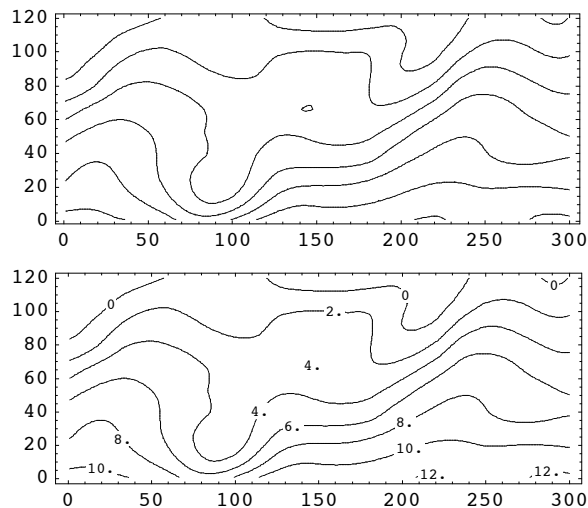
```
longitude = Table[i, {i, 119.25, 145.125, 1.125}];
```

```
approx = ListInterpolation[sfstmean, {latitude, longitude}];
```

```
approxData = Table[approx[lat, lon], {lat, 40, 50, 0.0834}, {lon, 120, 145, 0.0834}];
```

```
gtemp = LabelContourLines[ListContourPlot[approxData,
```

```
Contours → {0, 2, 4, 6, 8, 10, 12}, ContourShading → False, AspectRatio → ratio];
```



```
pr = ReadListBinary["precipitation/2000_prep", Single];
rn = ReadListBinary["rad/2000_rn", Single];
(* if precipitation amount is very low, rdi, dryness index is set to 4 *)
rdi = MapThread[If[#1 <= 0.0001, 4., #2/(582.8*#1)] &, {pr, rn}];
rdi = Map[If[#1 > 4, 4, #] &, rdi];
npp = 0.29*Exp[-0.216*rdi*rdi]*rn*0.001;
nppmean = Partition[npp, 24];

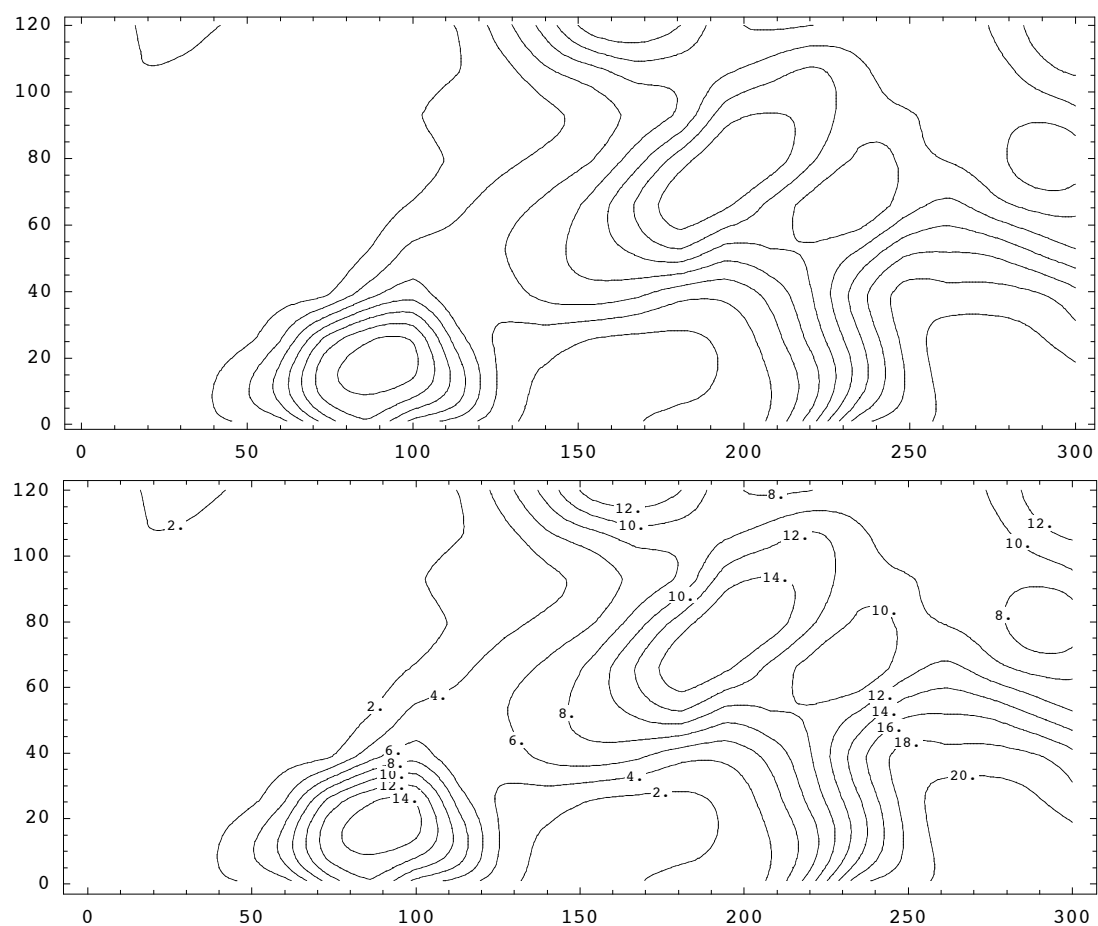
totalPrep = Partition[ReadListBinary["precipitation/2000_prep", Single], 24];

latitude = {39.8129, 40.9343, 42.0558, 43.1773,
            44.2988, 45.4203, 46.5418, 47.6632, 48.7847, 49.9062, 51.0277};
longitude = Table[i, {i, 119.25, 145.125, 1.125}];
approx = ListInterpolation[nppmean, {latitude, longitude}];
approxData = Table[approx[lat, lon], {lat, 40, 50, 0.0834}, {lon, 120, 145, 0.0834}];

Interpolation::innd : nppmean の第1の引数はデータと座標のリストを含んでいません。 詳細

{Dimensions[approxData], {Max[approxData]}, {Min[approxData]}}
{{120, 300}, {22.4628}, {0.80407}}

gprep = LabelContourLines[ListContourPlot[approxData, Contours -> {2, 4, 6, 8, 10, 12, 14, 16,
18, 20},
ContourShading -> False, AspectRatio -> ratio]]];
```



```

makeGraph[ndviFile_,tempFile_]:=
(sbyte = OpenRead[ndviFile];
a = Read[sbyte, array];
Close[sbyte];
a1=Reverse[a];
b=Take[a1,{2401,3600,10}];
b1=Transpose[b];
b2=Take[b1,{1,3000,10}];
c=Transpose[b2];

area=ReplacePart[c, (#-99)/100, Position[c, #1=0]];
g2=ListDensityPlot[area, Mesh->False, PlotLabel->ndviFile,
  ColorFunction->(If[#==0, Hue[0.5, 0.2, 1],
    Hue[0.4(#), 1, 1-.56#]]&), AspectRatio->ratio, DisplayFunction->Identity];

pr=ReadListBinary["precipitation/"<>tempFile<> "_prep", Single];
rn=ReadListBinary["rad/"<>tempFile<> "_rn", Single];
(* if precipitation amount is very low, rdi, dryness index is set to 4 *)
rdi=MapThread[If[#1<=0.0001, 4., #2/(582.8*#1)]&, {pr, rn}];
rdi=Map[If[#1>4, 4, #]&, rdi];
npp=0.29*Exp[-0.216*rdi*rdi]*rn*0.001;

ratio=120/300.;
p=Partition[npp, 24];
latitude={39.8129, 40.9343, 42.0558, 43.1773, 44.2988, 45.4203, 46.5418, 47.6632,
  48.7847, 49.9062, 51.0277};
longitude=Table[i, {i, 119.25, 145.125, 1.125}];
approx=ListInterpolation[p, {latitude, longitude}];
approxData=Table[approx[lat, lon], {lat, 40, 50, 0.0834}, {lon, 120, 145, 0.0834}];
g0=ListContourPlot[approxData, Contours->5, PlotLabel->tempFile,
  ContourShading->False, AspectRatio->ratio, DisplayFunction->Identity];
g1=LabelContourLines[g0, DisplayFunction->Identity];
Show[g2, g1, DisplayFunction-> $DisplayFunction];)

Do[
ndviFile="2000-ndvi.raw/00"<>If[i<10, "0"<>ToString[i], ToString[i]]<>"-ndvi.raw";
tempFile="00"<>If[i<10, "0"<>ToString[i], ToString[i]];
makeGraph[ndviFile, tempFile]
, {i, 1, 12}]

```