Simulation and Scientific Computing 2 Seminar

David Uhl, Thomas Stadelmayer

Friedrich Alexander Universität Erlangen Nürnberg

June 2, 2015

Overview

Red-Black Gauss-Seidel

```
1 for (int iter = 0; iter < times; iter++){
2 // red points
3 #pragma omp parallel for
4 for (int j = 1; j < height-1; j++){
5    for (int i = 1; i < width-1; i++){
6      if(j == (height-1)*0.5 && i >= (width-1)*0.5) continue;
7        // i+j gerade
8       if( ((i + j) % 2) == 0){
9          u(i,j) = factor * (f(i,j) + h_2_inv * (
10            u(i-1, j) + u(i+1, j) + u(i, j+1) + u(i, j-1)));
11 }}}
12 // black points
13 #pragma omp parallel for
14 for (int j = 1; j < height-1; j++){
15    for (int i = 1; i < width-1; i++){
16     if(j == (height-1)*0.5 && i >= (width-1)*0.5) continue;
17       // i+j ungerade
18       if( ((i + j) % 2) == 1){
19          u(i,j) = factor * (f(i,j) + h_2_inv * (
20            u(i-1, j) + u(i+1, j) + u(i, j+1) + u(i, j-1)));
21 }}}}
```

Figure: Schrdelbert GmbH

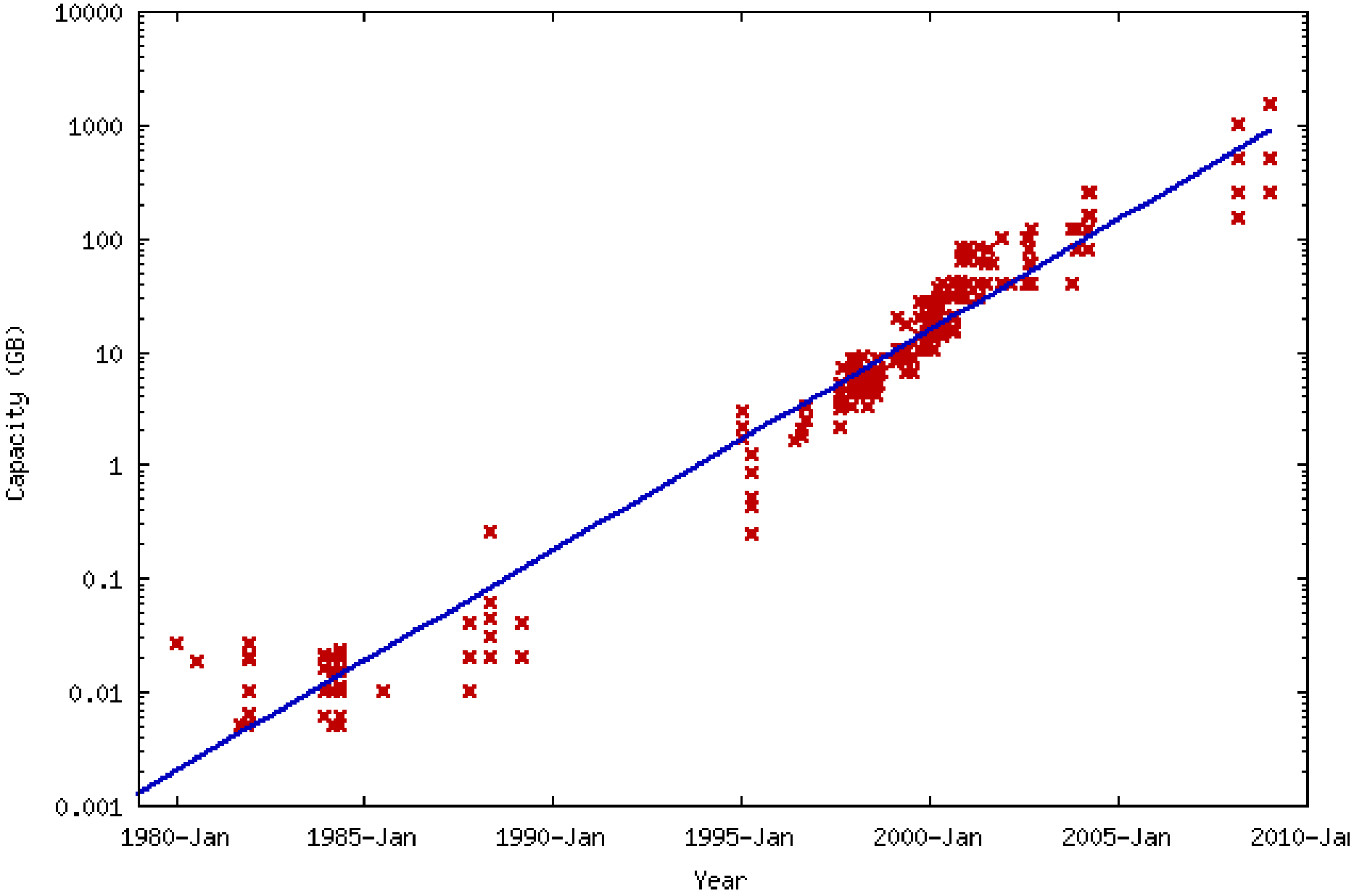
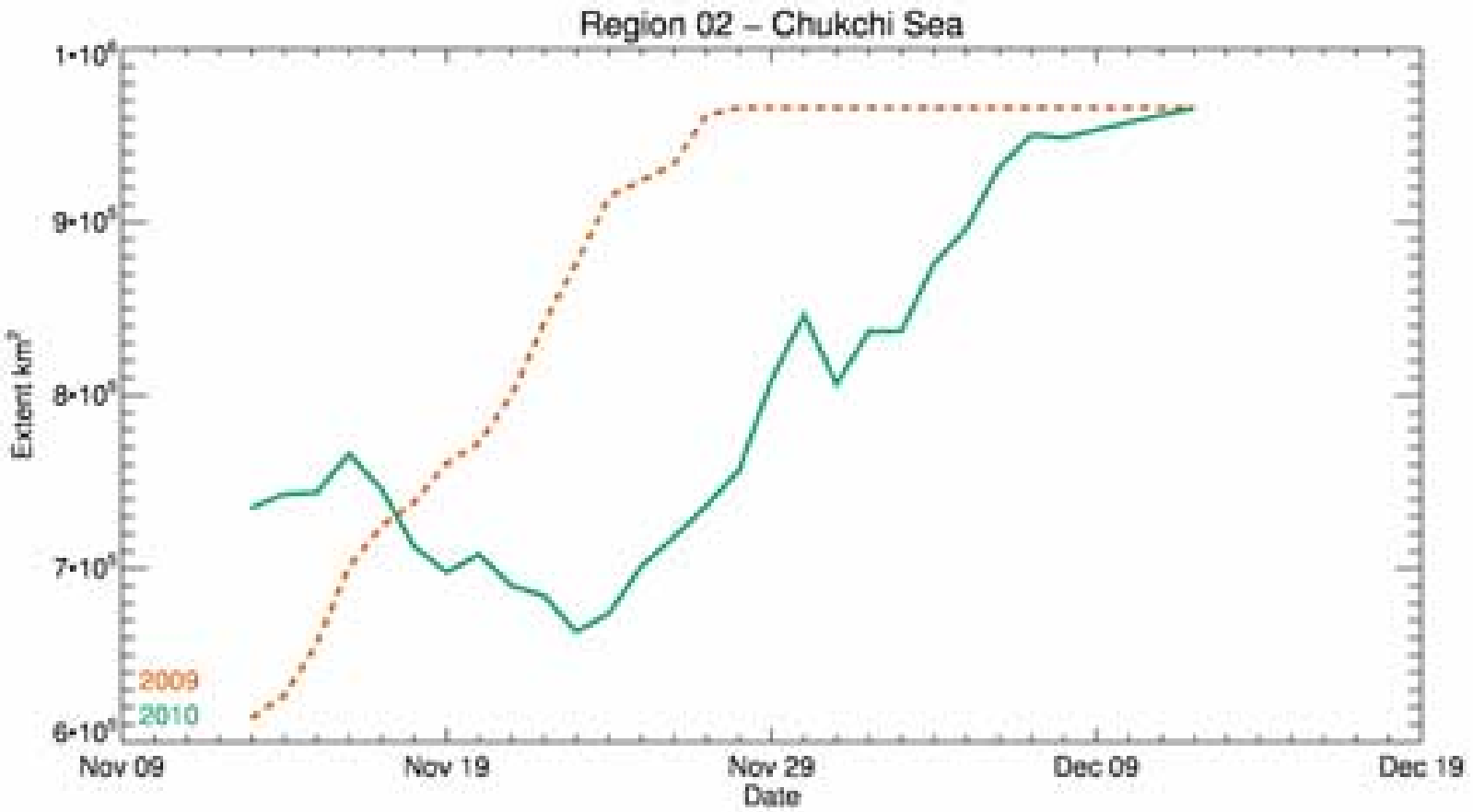
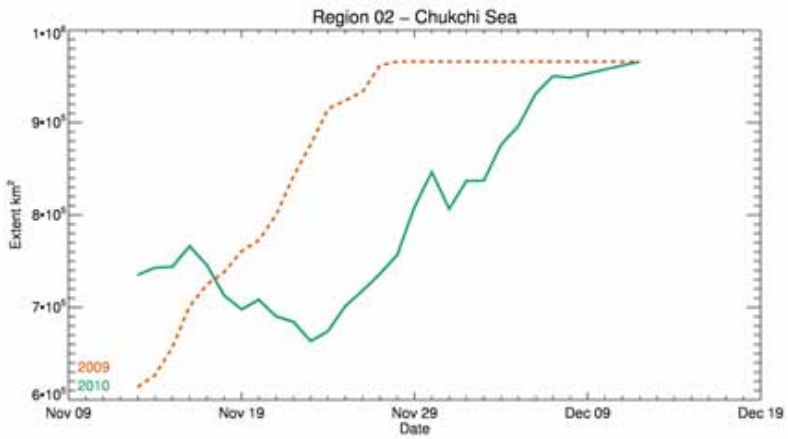
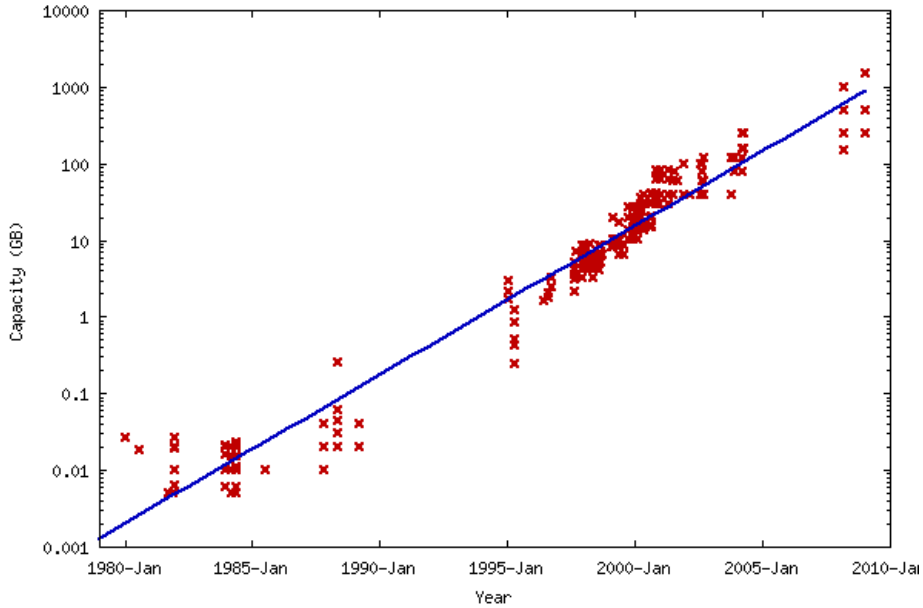

10000
1000
100
10
1
0.1
0.01
0.001
Capacity (GB)
1980-Jan
1985-Jan
1990-Jan
1995-Jan
2000-Jan
2005-Jan
2010-Jan
Year

Figure: Sinnfrei Inc.





(a) serial



(b) parallel

Figure: time plots