

# BS Ice Kohonen analysis

Using 8day averaged ice concentration data (S.Salo)

Choose a select group of locations on grid. (every 4th point)

```
dp = read.csv('/Volumes/WDC_internal/Users/bell/in_and_outbox/2017/stabeno/Ice_kohonen/coords_subset_4p
```

dp

##	findex	lat	lon	ice	count
## 1	12	60.15	179.39	0.00	4
## 2	20	60.15	180.00	0.00	4
## 3	32	60.46	180.00	0.00	4
## 4	44	60.46	180.62	0.00	4
## 5	48	61.07	179.37	0.00	4
## 6	56	60.14	181.84	0.00	4
## 7	60	60.76	180.63	0.00	4
## 8	64	61.37	179.36	0.00	4
## 9	72	60.13	182.45	0.00	4
## 10	76	60.76	181.25	0.00	4
## 11	80	61.38	180.00	0.00	4
## 12	88	60.11	183.06	0.00	4
## 13	92	60.75	181.88	0.00	4
## 14	96	61.37	180.64	0.00	4
## 15	100	61.99	179.35	0.00	4
## 16	104	60.09	183.67	0.00	4
## 17	108	60.74	182.50	0.00	4
## 18	112	61.37	181.28	0.00	4
## 19	116	61.99	180.00	0.00	4
## 20	120	60.23	184.00	0.00	4
## 21	124	60.88	182.83	0.00	4
## 22	128	61.52	181.61	0.00	4
## 23	132	62.15	180.33	0.00	4
## 24	136	60.21	184.61	0.00	4
## 25	140	60.87	183.46	0.00	4
## 26	144	61.51	182.25	0.00	4
## 27	148	62.14	180.99	0.00	4
## 28	156	60.52	184.66	0.00	4
## 29	160	61.17	183.50	0.00	4
## 30	164	61.82	182.28	0.00	4
## 31	168	62.45	181.00	0.00	4
## 32	176	60.32	185.56	0.00	4
## 33	180	60.99	184.42	0.00	4
## 34	184	61.64	183.23	0.00	4
## 35	188	62.28	181.99	0.00	4
## 36	192	62.92	180.68	0.00	4
## 37	200	60.46	185.90	0.00	4
## 38	204	61.13	184.76	0.00	4
## 39	208	61.78	183.58	0.00	4
## 40	212	62.43	182.33	0.00	4
## 41	216	63.07	181.02	0.00	4
## 42	220	63.69	179.65	41.75	4

## 43	228	60.93	185.68	0.00	4
## 44	232	61.60	184.52	0.00	4
## 45	236	62.26	183.31	0.00	4
## 46	240	62.90	182.03	0.00	4
## 47	244	63.53	180.69	0.00	4
## 48	252	60.90	186.31	0.00	4
## 49	256	61.57	185.17	0.00	4
## 50	260	62.24	183.97	0.00	4
## 51	264	62.89	182.71	0.00	4
## 52	268	63.53	181.39	0.00	4
## 53	272	60.18	188.00	0.00	4
## 54	276	60.87	186.93	0.00	4
## 55	280	61.54	185.81	0.00	4
## 56	284	62.21	184.63	0.00	4
## 57	288	62.87	183.39	0.00	4
## 58	292	63.52	182.08	0.00	4
## 59	296	60.13	188.61	0.00	4
## 60	300	60.83	187.55	0.00	4
## 61	304	61.51	186.45	0.00	4
## 62	308	62.19	185.28	0.00	4
## 63	312	62.85	184.06	0.00	4
## 64	316	63.51	182.78	0.00	4
## 65	320	60.09	189.21	0.00	4
## 66	324	60.78	188.17	0.00	4
## 67	328	61.47	187.09	0.00	4
## 68	332	62.16	185.94	0.00	4
## 69	336	62.83	184.74	0.00	4
## 70	340	63.49	183.47	0.00	4
## 71	344	60.04	189.81	0.00	4
## 72	348	60.74	188.79	0.00	4
## 73	352	61.43	187.72	0.00	4
## 74	356	62.12	186.59	0.00	4
## 75	360	62.80	185.41	0.00	4
## 76	364	63.47	184.16	0.00	4
## 77	368	60.16	190.17	0.00	4
## 78	372	60.87	189.15	0.00	4
## 79	376	61.57	188.08	0.00	4
## 80	380	62.26	186.96	0.00	4
## 81	384	62.94	185.78	0.00	4
## 82	388	63.61	184.53	0.00	4
## 83	392	60.28	190.53	0.00	4
## 84	396	60.99	189.51	0.00	4
## 85	400	61.70	188.45	0.00	4
## 86	404	62.39	187.33	0.00	4
## 87	408	63.08	186.15	0.00	4
## 88	412	63.75	184.91	0.00	4
## 89	416	60.41	190.89	0.00	4
## 90	420	61.12	189.88	0.00	4
## 91	424	61.83	188.82	0.00	4
## 92	428	62.52	187.71	0.00	4
## 93	432	63.21	186.53	0.00	4
## 94	436	63.89	185.29	0.00	4
## 95	440	60.71	191.00	0.00	4
## 96	444	61.42	189.99	0.00	4

```
## 97      448 62.13 188.92  0.00      4
## 98      452 62.83 187.80  0.00      4
## 99      456 63.52 186.61  0.00      4
## 100     464 61.01 191.12  0.00      4
## 101     468 61.72 190.10  0.00      4
## 102     472 62.43 189.02  0.00      4
## 103     476 63.14 187.89  0.00      4
## 104     480 63.83 186.69  0.00      4
## 105     484 60.76 191.99  0.00      4
## 106     488 61.49 190.99  0.00      4
## 107     492 62.21 189.95  0.00      4
## 108     496 62.92 188.85  0.00      4
## 109     508 61.25 191.87  0.00      4
## 110     512 61.97 190.86  0.00      4
## 111     516 62.69 189.79  0.00      4
## 112     528 61.55 192.00  0.00      4
## 113     532 62.27 190.99  0.00      4
## 114     548 61.48 192.63  0.00      4
## 115     552 62.21 191.63  0.00      4
## 116     568 61.97 192.53  0.00      4
## 117     572 62.70 191.51  0.00      4
## 118     592 62.63 192.17  0.00      4
## 119     608 63.12 192.05  0.00      4
## 120     620 63.42 192.19  0.00      4
## 121     632 63.72 192.34  0.00      4
## 122     640 63.66 193.02  8.35      4
## 123     648 63.77 193.44 11.45      4
```

```
library(kohonen)
```

```
## Warning: package 'kohonen' was built under R version 3.3.2
```

```
ice_data = read.csv('/Volumes/WDC_internal/Users/bell/in_and_outbox/2017/stabeno/Ice_kohonen/first20_ti
```

```
ice_data
```

```
##      p12 p20 p32 p44  p48 p56  p60  p64 p72  p76  p80 p88  p92  p96
## 1      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 2      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 3      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 4      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 5      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 6      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 7      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 8      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 9      0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 10     0  0  0  0  0 0.00  0 0.00 18.75  0 0.00 0.00  0 0.00 0.00
## 11     0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 12     0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 13     0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 14     0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 15     0  0  0  0  0 0.00  0 0.00 0.00  0 0.00 0.00  0 0.00 0.00
## 16     0  0  0  0  0 0.00  0 0.00 21.27  0 0.00 15.20  0 12.07 20.30
## 17     0  0  0  0  0 21.25  0 16.58 38.73  0 27.98 47.03  0 20.27 49.60
## 18     0  0  0  0  0 0.00  0 0.00 31.38  0 17.60 29.45  0 23.02 27.25
```

## 19	0	0	0	0	17.65	0	0.00	28.98	0	0.00	20.92	0	0.00	0.00
## 20	0	0	0	0	0.00	0	0.00	39.45	0	0.00	23.90	0	0.00	27.73
##	p100	p104	p108	p112	p116	p120	p124	p128	p132	p136	p140	p144		
## 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 5	17.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 6	54.35	0.00	0.00	0.00	15.88	0.00	0.00	0.00	27.65	0.00	0.00	0.00	0.00	
## 7	38.05	0.00	0.00	0.00	17.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 8	6.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.40	0.00	0.00	0.00	0.00	
## 9	26.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.43	0.00	0.00	0.00	0.00	
## 10	64.03	0.00	0.00	0.00	44.28	0.00	0.00	0.00	42.25	0.00	0.00	0.00	0.00	
## 11	54.40	0.00	0.00	0.00	31.00	0.00	0.00	0.00	18.67	0.00	0.00	0.00	0.00	
## 12	13.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 15	31.17	0.00	0.00	0.00	42.50	0.00	0.00	0.00	32.88	0.00	0.00	19.98	0.00	
## 16	55.48	10.52	23.20	25.00	60.25	12.82	39.50	47.70	73.28	16.35	53.17	61.12	0.00	
## 17	74.10	0.00	37.60	65.95	80.57	12.43	63.08	77.00	90.98	8.07	66.40	83.35	0.00	
## 18	74.65	0.00	25.83	34.88	65.43	11.10	23.60	36.62	76.55	0.00	22.48	40.17	0.00	
## 19	70.80	0.00	0.00	0.00	68.05	0.00	0.00	0.00	59.98	0.00	0.00	0.00	0.00	
## 20	82.05	0.00	0.00	20.02	76.62	0.00	0.00	47.67	82.88	0.00	10.30	56.70	0.00	
##	p148	p156	p160	p164	p168	p176	p180	p184	p188	p192	p200	p204		
## 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.60	0.00	0.00	0.00	
## 6	0.00	0.00	0.00	0.00	15.75	0.00	0.00	0.00	9.27	43.78	0.00	0.00	0.00	
## 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.12	0.00	0.00	0.00	
## 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.15	0.00	0.00	0.00	
## 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.17	0.00	0.00	0.00	
## 10	9.00	0.00	0.00	0.00	28.38	0.00	0.00	0.00	0.00	72.95	0.00	0.00	0.00	
## 11	0.00	0.00	0.00	0.00	15.32	0.00	0.00	0.00	0.00	51.13	0.00	0.00	0.00	
## 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 13	0.00	0.00	0.00	9.12	8.40	0.00	0.00	17.05	25.00	10.95	0.00	0.00	0.00	
## 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.60	0.00	0.00	0.00	
## 15	36.75	0.00	17.12	31.80	47.50	23.02	23.85	34.22	53.75	86.68	37.90	42.80	0.00	
## 16	70.45	51.88	70.33	73.97	89.93	35.10	77.47	83.88	84.57	98.75	47.55	82.47	0.00	
## 17	95.43	45.25	85.38	90.03	99.10	28.80	83.62	93.90	98.30	95.53	62.30	89.67	0.00	
## 18	77.95	0.00	30.65	46.75	94.08	0.00	30.03	53.20	78.15	99.72	24.80	33.20	0.00	
## 19	59.70	0.00	0.00	0.00	88.88	0.00	0.00	0.00	63.70	97.35	0.00	0.00	0.00	
## 20	86.50	0.00	23.40	80.95	98.65	0.00	0.00	74.15	95.62	99.82	0.00	13.00	0.00	
##	p208	p212	p216	p220	p228	p232	p236	p240	p244	p252	p256			
## 1	0.00	0.00	0.00	41.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 2	0.00	0.00	0.00	41.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 3	0.00	0.00	0.00	41.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 4	0.00	0.00	0.00	41.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 5	0.00	0.00	9.20	57.60	0.00	0.00	0.00	0.00	21.62	0.00	0.00	0.00	0.00	
## 6	0.00	0.00	16.08	99.45	0.00	0.00	0.00	0.00	43.17	0.00	0.00	0.00	0.00	
## 7	0.00	0.00	17.25	100.00	0.00	0.00	0.00	8.75	58.75	0.00	0.00	0.00	0.00	
## 8	0.00	0.00	0.00	80.05	0.00	0.00	0.00	0.00	10.80	0.00	0.00	0.00	0.00	
## 9	0.00	0.00	16.45	82.72	0.00	0.00	0.00	0.00	25.17	0.00	0.00	0.00	0.00	

##	10	0.00	0.00	52.17	100.00	0.00	0.00	0.00	0.00	94.38	0.00	0.00	
##	11	0.00	0.00	36.85	98.75	0.00	0.00	0.00	0.00	82.10	0.00	0.00	
##	12	0.00	14.78	26.30	98.80	0.00	0.00	21.58	17.30	84.50	0.00	0.00	
##	13	20.75	23.62	17.15	95.08	0.00	0.00	25.00	23.58	32.08	0.00	6.78	
##	14	0.00	0.00	11.80	94.28	0.00	0.00	0.00	10.50	72.68	0.00	0.00	
##	15	51.65	61.38	87.62	97.25	60.05	57.10	60.70	82.00	95.53	67.90	76.28	
##	16	86.32	89.25	96.28	99.57	87.50	89.10	91.78	94.68	98.30	90.78	95.75	
##	17	98.00	100.00	95.80	100.00	85.97	98.88	97.27	97.20	99.00	91.55	98.98	
##	18	64.20	84.92	100.00	100.00	33.05	51.62	82.20	98.80	100.00	30.30	59.15	
##	19	0.00	69.95	97.05	98.67	0.00	8.62	55.62	95.70	96.80	0.00	7.62	
##	20	87.83	96.55	100.00	98.75	14.62	71.28	98.88	99.95	100.00	21.77	70.28	
##		p260	p264	p268	p272	p276	p280	p284	p288	p292	p296	p300	
##	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	7	0.00	0.00	34.85	0.00	0.00	0.00	0.00	0.00	19.55	0.00	0.00	
##	8	0.00	0.00	11.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	9	0.00	0.00	14.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	10	0.00	0.00	52.65	0.00	0.00	0.00	0.00	0.00	33.12	0.00	0.00	
##	11	0.00	15.38	49.12	0.00	0.00	0.00	0.00	19.98	34.60	0.00	0.00	
##	12	48.47	43.57	77.07	0.00	0.00	14.12	41.05	78.00	60.15	0.00	0.00	
##	13	28.90	23.65	39.00	0.00	0.00	8.18	21.35	56.90	37.08	0.00	0.00	
##	14	0.00	32.35	83.05	0.00	0.00	0.00	0.00	35.95	66.08	12.32	0.00	
##	15	75.75	80.88	96.00	43.25	72.50	86.23	81.60	89.75	95.58	46.80	81.75	
##	16	95.10	98.28	96.90	87.65	92.07	99.50	93.45	97.18	96.53	91.05	97.40	
##	17	97.85	98.40	98.62	97.35	96.88	99.03	98.88	98.53	98.68	94.43	97.97	
##	18	81.23	97.30	99.65	22.75	34.38	63.40	76.88	97.98	99.28	19.88	45.88	
##	19	51.88	93.70	97.30	0.00	0.00	6.95	67.10	82.53	99.22	0.00	0.00	
##	20	97.55	99.15	100.00	0.00	29.73	67.52	95.78	98.62	99.95	0.00	0.00	
##		p304	p308	p312	p316	p320	p324	p328	p332	p336	p340	p344	
##	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	7	0.00	0.00	0.00	35.03	0.00	0.00	0.00	11.07	13.20	43.08	0.00	
##	8	0.00	0.00	0.00	10.55	0.00	0.00	0.00	0.00	0.00	11.23	0.00	
##	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
##	10	0.00	0.00	0.00	14.05	0.00	0.00	0.00	0.00	0.00	27.00	0.00	
##	11	0.00	11.20	20.88	13.88	0.00	0.00	0.00	13.55	20.25	28.62	0.00	
##	12	11.48	57.77	80.93	81.53	0.00	6.88	20.45	66.47	97.72	88.82	11.52	
##	13	10.23	43.33	73.67	61.43	9.98	7.53	12.52	59.15	89.50	81.28	20.77	
##	14	7.55	8.05	54.20	93.78	34.58	30.10	27.45	39.95	77.88	99.55	57.02	
##	15	93.70	90.18	96.82	97.35	65.62	90.82	92.35	94.62	97.95	98.90	76.10	
##	16	98.07	96.68	97.30	94.82	97.05	97.45	96.55	97.25	96.80	96.50	95.80	
##	17	99.20	97.95	99.53	97.85	93.12	96.50	99.05	97.95	99.55	97.53	96.78	
##	18	74.08	80.60	99.03	98.05	19.05	35.08	87.12	78.60	93.27	97.80	20.45	
##	19	8.20	75.25	82.30	97.65	0.00	0.00	7.72	72.93	77.78	92.85	0.00	
##	20	67.10	93.42	97.03	100.00	0.00	19.75	66.65	94.80	93.75	99.70	0.00	
##		p348	p352	p356	p360	p364	p368	p372	p376	p380	p384	p388	p392

## 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 7	0.00	0.00	0.00	18.20	45.17	0.00	0.00	0.00	15.00	23.52	77.72	0.00
## 8	0.00	0.00	0.00	0.00	10.62	0.00	0.00	0.00	0.00	0.00	34.58	0.00
## 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.62	0.00
## 10	0.00	0.00	0.00	0.00	29.15	0.00	0.00	0.00	0.00	0.00	52.52	0.00
## 11	0.00	0.00	0.00	21.30	43.55	0.00	0.00	0.00	0.00	27.95	49.90	0.00
## 12	19.73	39.05	62.03	95.12	96.40	38.35	45.72	62.25	75.58	94.20	97.95	68.12
## 13	40.48	35.00	66.98	93.95	97.40	51.05	57.80	62.62	80.52	93.75	95.70	68.60
## 14	60.72	51.23	68.40	92.40	98.68	78.97	83.75	83.55	89.32	98.45	97.10	84.60
## 15	94.05	95.62	95.75	95.62	97.55	89.40	96.70	98.60	94.28	95.15	93.03	91.80
## 16	96.50	96.92	96.70	97.22	98.75	97.20	98.62	96.27	95.50	98.75	98.27	96.22
## 17	99.38	95.88	96.47	97.05	98.55	94.22	98.20	94.82	97.20	98.65	96.38	95.05
## 18	33.12	81.47	84.88	87.77	90.83	21.62	33.50	71.03	83.35	88.85	89.28	22.83
## 19	0.00	0.00	73.62	80.88	94.28	0.00	0.00	17.77	78.53	78.82	89.88	0.00
## 20	10.05	64.20	94.05	94.97	99.25	0.00	13.88	77.95	95.40	92.92	98.40	0.00
##	p396	p400	p404	p408	p412	p416	p420	p424	p428	p432	p436	p440
## 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
## 6	0.00	0.00	0.00	0.00	18.83	0.00	0.00	0.00	0.00	9.48	37.05	0.00
## 7	0.00	0.00	19.62	68.15	80.05	0.00	0.00	0.00	22.65	72.40	84.53	0.00
## 8	0.00	0.00	0.00	0.00	38.35	0.00	0.00	0.00	0.00	9.65	60.23	0.00
## 9	0.00	0.00	0.00	6.80	54.98	0.00	0.00	0.00	0.00	0.00	68.90	0.00
## 10	0.00	0.00	0.00	0.00	46.78	0.00	0.00	0.00	0.00	0.00	52.50	0.00
## 11	0.00	0.00	0.00	32.25	51.50	0.00	0.00	8.07	14.35	37.38	72.32	7.15
## 12	70.22	75.62	85.20	97.43	97.10	80.15	84.65	89.18	91.85	98.20	98.62	90.75
## 13	85.92	80.72	91.43	98.28	93.57	95.05	99.28	92.40	95.92	97.85	92.72	97.05
## 14	95.97	94.60	98.05	99.60	98.88	92.88	99.30	98.22	98.78	99.50	99.62	97.25
## 15	98.85	98.47	90.92	93.23	97.25	92.15	98.97	96.25	93.45	88.30	95.60	96.05
## 16	99.85	97.95	96.80	96.82	94.65	99.00	99.68	98.72	97.53	96.45	93.57	99.90
## 17	98.80	93.60	93.12	94.88	94.72	96.08	99.78	94.80	93.15	94.10	91.80	97.05
## 18	56.40	76.35	82.05	85.40	86.62	46.25	60.50	88.72	76.53	84.55	80.60	51.73
## 19	0.00	31.55	80.47	75.83	85.90	0.00	7.78	48.38	89.38	71.53	77.35	0.00
## 20	17.15	82.35	93.17	90.25	95.85	0.00	46.45	81.82	92.20	90.28	94.68	0.00
##	p444	p448	p452	p456	p464	p468	p472	p476	p480	p484	p488	
## 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
## 5	0.00	0.00	0.00	7.35	0.00	0.00	0.00	7.38	27.15	0.00	0.00	
## 6	0.00	0.00	7.80	29.82	0.00	0.00	0.00	13.60	59.62	0.00	0.00	
## 7	0.00	0.00	43.73	87.40	0.00	0.00	13.40	71.45	84.97	0.00	0.00	
## 8	0.00	0.00	0.00	18.12	0.00	0.00	0.00	9.35	44.65	0.00	0.00	
## 9	0.00	0.00	0.00	33.92	0.00	0.00	0.00	24.67	56.83	8.15	0.00	
## 10	0.00	0.00	0.00	28.20	0.00	0.00	0.00	0.00	38.35	0.00	0.00	
## 11	15.90	13.40	27.02	55.45	20.20	27.75	23.15	33.03	67.15	32.17	44.15	
## 12	92.80	94.70	96.10	99.53	95.20	96.55	95.35	98.20	97.55	94.18	99.47	

```

## 13 100.00 96.32 96.50 96.65 99.82 98.82 98.62 96.90 93.20 99.70 100.00
## 14 98.15 98.82 99.90 99.00 99.38 100.00 100.00 99.38 95.85 95.70 98.53
## 15 98.55 95.35 91.00 91.40 97.35 99.43 95.85 87.02 90.38 93.07 98.68
## 16 100.00 99.95 93.17 96.15 100.00 99.68 97.85 89.18 94.22 94.82 100.00
## 17 99.12 92.88 89.50 92.75 98.78 98.22 91.18 85.28 92.12 94.40 99.95
## 18 71.03 93.28 70.12 84.75 56.33 79.73 87.70 74.75 79.95 54.75 65.15
## 19 7.05 69.42 78.73 72.97 9.00 18.40 79.88 70.12 73.62 0.00 9.35
## 20 67.70 90.32 88.78 89.85 16.52 81.78 89.07 82.97 89.83 0.00 52.78
##      p492 p496 p508 p512 p516 p528 p532 p548 p552 p568
## 1      0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
## 2      0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
## 3      0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
## 4      0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
## 5      0.00 8.20 0.00 0.00 7.35 0.00 0.00 0.00 0.00 13.15
## 6      0.00 22.38 0.00 0.00 20.70 0.00 0.00 20.20 0.00 19.02
## 7     13.88 35.42 0.00 0.00 36.00 25.00 19.17 61.42 16.58 68.88
## 8      0.00 22.12 0.00 0.00 7.07 0.00 0.00 9.25 0.00 19.10
## 9      0.00 15.32 0.00 0.00 7.10 0.00 0.00 48.02 0.00 58.93
## 10     0.00 0.00 0.00 0.00 0.00 0.00 0.00 30.45 0.00 52.02
## 11    31.70 33.42 58.55 39.00 42.40 76.38 43.58 89.78 66.03 90.28
## 12    97.97 95.95 98.33 100.00 96.70 99.20 99.97 99.82 100.00 99.40
## 13   100.00 97.80 100.00 100.00 100.00 97.43 100.00 96.08 98.15 99.28
## 14    99.88 99.97 98.08 100.00 97.78 97.62 100.00 95.00 98.60 97.30
## 15    98.62 92.62 93.82 98.50 95.28 94.30 99.70 91.85 99.45 95.67
## 16    97.22 86.95 97.52 97.60 92.55 99.15 98.25 92.15 100.00 99.47
## 17    96.35 88.18 98.07 98.23 89.77 99.28 96.38 95.55 98.00 97.53
## 18    91.60 73.07 52.33 84.82 81.95 45.35 89.07 53.42 78.12 49.17
## 19    62.47 74.57 7.75 29.18 77.38 0.00 51.33 0.00 24.17 0.00
## 20    92.75 82.85 0.00 86.38 84.57 31.05 89.02 0.00 78.25 33.58
##      p572 p592 p608 p620 p632 p640 p648
## 1      0.00 0.00 0.00 0.00 0.00 8.35 11.45
## 2      0.00 0.00 0.00 0.00 0.00 8.35 11.45
## 3      0.00 0.00 0.00 0.00 0.00 8.35 11.45
## 4      0.00 0.00 0.00 0.00 0.00 8.35 11.45
## 5      0.00 0.00 0.00 0.00 8.15 34.75 52.25
## 6      0.00 7.70 12.20 19.20 24.88 41.90 77.12
## 7     26.38 43.03 50.08 67.45 82.75 92.22 97.28
## 8      0.00 8.02 7.28 22.07 20.92 43.32 61.60
## 9      0.00 7.00 8.32 26.00 40.62 47.68 54.73
## 10     0.00 17.52 0.00 0.00 0.00 52.78 69.15
## 11    58.57 79.00 73.90 78.60 81.85 92.17 93.22
## 12   100.00 98.07 96.55 97.08 98.82 100.00 100.00
## 13    98.38 100.00 97.47 98.50 100.00 99.05 98.65
## 14    97.57 99.80 100.00 100.00 100.00 100.00 98.25
## 15    99.32 98.57 100.00 100.00 100.00 100.00 98.53
## 16    99.95 99.30 92.43 99.78 98.93 99.93 98.95
## 17    99.03 98.35 99.18 97.92 99.88 98.28 99.75
## 18    87.48 77.25 86.90 90.80 99.47 98.32 98.80
## 19    69.65 29.85 59.00 71.05 72.03 63.65 73.05
## 20    89.97 74.25 93.00 99.70 96.18 83.57 85.97

```

```

som.BS <- som(scale(ice_data,scale=TRUE,center=TRUE),grid=somgrid(2,3,"hexagonal"),maxNA.fraction=1)
map(som.BS)

```

```
## $unit.classif
## [1] 6 6 6 6 6 6 4 6 6 6 4 2 2 2 1 3 3 1 4 1
##
## $distances
## [1] 3.697923 3.697923 3.697923 3.697923 1.200519 9.438878 17.232346
## [8] 4.239594 8.346736 23.221258 16.940390 3.047246 1.731421 7.759223
## [15] 47.575922 29.335475 21.908880 20.638981 48.856815 35.601104
##
## $whatmap
## [1] 1
##
## $user.weights
## [1] 1
```

```
getCodes(som.BS)
```

```
##          p12          p20          p32          p44          p48          p56
## V1 -0.9676651 -0.61649032 -0.4060468 -0.8648354 -0.322296689 -0.4640569
## V2 -0.7104356 -0.42719889 -0.7811236 -1.0364582 -0.322579921 -0.7212711
## V3 -0.7291595 -0.32405541 -0.5421697 -0.2236068 1.571448888 -0.7212711
## V4 -0.7619665 -0.46768477 -0.3159184 -1.4027253 0.664236761 -0.6361806
## V5 -0.6803620 -0.83880755 -0.3059399 -0.6803620 -0.004448156 -0.7734164
## V6 -0.8212153 0.04431452 -0.3090835 -0.7811236 -0.323358216 -1.0009008
##          p60          p64          p72          p76          p80          p88
## V1 -0.2231400 0.95775231 -0.4592617 0.5275005 0.80203260 -0.9475868
## V2 -0.2236005 -0.60793804 -0.8648354 -0.3159112 -0.51072750 -0.3159184
## V3 2.1653207 1.47981181 -0.5604614 1.7651109 1.90417135 -0.3240554
## V4 -0.2235225 0.05654221 -0.9475868 -0.3158447 0.01637517 -1.7611523
## V5 -0.1016056 -0.04554701 -0.5997969 -0.2081251 -0.07413113 -0.4494671
## V6 -0.2236068 -0.46897459 -0.8386670 -0.3159184 -0.51114692 -0.6943338
##          p92          p96          p100          p104          p108          p112
## V1 0.74107182 0.84979494 0.9435317 -0.2215979 0.4240168137 0.64062019
## V2 -0.39494698 -0.45335690 -0.9368763 -0.2236068 -0.3985669645 -0.42751773
## V3 1.94396663 2.15218580 1.0665065 1.8061017 2.4274142530 2.31379689
## V4 -0.39470476 -0.45308179 0.7009557 -0.2231047 -0.3982681094 -0.42725890
## V5 -0.07004496 -0.07835717 -0.1299463 0.4082768 -0.0006217324 -0.07430912
## V6 -0.39495336 -0.45336336 -0.5492158 -0.2236068 -0.3985735082 -0.42752461
##          p116          p120          p124          p128          p132
## V1 1.17616471 0.45520306 0.11195884 0.7494619413 1.133027293
## V2 -0.82445455 -0.40855504 -0.37773118 -0.4640508917 -0.798543258
## V3 1.51240783 2.40132431 2.71839661 2.3357884366 1.720819629
## V4 0.45686230 -0.40818398 -0.37740051 -0.4637039967 0.005210834
## V5 -0.08486893 0.07687885 0.06059823 0.0001929362 -0.069233772
## V6 -0.62044302 -0.40856073 -0.37773750 -0.4640568546 -0.529359311
##          p136          p140          p144          p148          p156          p160
## V1 -0.3038885 0.1782912 0.981655592 1.27480561 -0.3221852 0.50505907
## V2 -0.3059370 -0.4060410 -0.509331916 -0.62385042 -0.3240511 -0.46212096
## V3 2.6335362 2.7769249 2.321362971 1.77417293 2.8599647 2.70530547
## V4 -0.3054419 -0.4056486 -0.509069814 -0.04825988 -0.3236099 -0.46181847
## V5 0.3280648 0.1101786 -0.009352819 -0.04150439 0.2474364 0.07028117
## V6 -0.3059399 -0.4060468 -0.509484130 -0.59634702 -0.3240554 -0.46225795
##          p164          p168          p176          p180          p184          p188
## V1 1.15495023 1.24133290 0.3365125 0.3130604 1.1053601 1.32089988
## V2 -0.41268579 -0.63577895 -0.4022337 -0.4247951 -0.3263558 -0.38659567
## V3 2.13454092 1.62333983 2.5019738 2.7372730 2.2238384 1.76463459
```

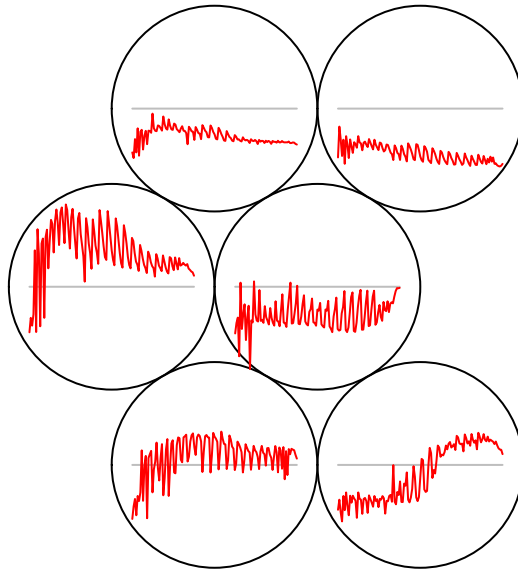


##	V4	-0.54172299	0.14124834	-0.4021337	-0.4245320	-0.5587569	-0.10551738
##	V5	-0.03246838	-0.04872675	0.1296192	0.0989686	-0.0282395	-0.06832035
##	V6	-0.54216969	-0.61588677	-0.4026386	-0.4249780	-0.5592342	-0.65498234
##		p192	p200	p204	p208	p212	p216
##	V1	1.3002332	0.6959621	0.6237761	1.32228219	1.35595257	1.3972579
##	V2	-0.8191674	-0.4588766	-0.4717741	-0.32335273	-0.29176864	-0.4852672
##	V3	1.3428414	2.4692722	2.6212336	2.03143985	1.72459621	1.4046492
##	V4	0.3373987	-0.4588300	-0.4715984	-0.57898396	-0.08812209	0.2858245
##	V5	-0.1140074	-0.0100746	0.0542542	-0.07364043	-0.07895816	-0.1393985
##	V6	-0.6168639	-0.4592617	-0.4720706	-0.57946014	-0.68775819	-0.7291592
##		p220	p228	p232	p236	p240	p244
##	V1	0.6454280	0.78081567	1.20409330	1.38348223	1.43427696	1.04918964
##	V2	0.5429160	-0.48401095	-0.55672964	-0.21011306	-0.29635454	0.08596464
##	V3	0.6931794	2.47503869	2.21686886	1.76303356	1.49532987	1.05476923
##	V4	0.6646096	-0.48391177	-0.47081604	-0.20583477	0.08608537	0.57787910
##	V5	-0.4511453	0.04002152	-0.01418241	-0.08999637	-0.09741459	-0.33056918
##	V6	-0.8951238	-0.48440506	-0.55711980	-0.69324332	-0.72860238	-0.89279787
##		p252	p256	p260	p264	p268	p272
##	V1	0.82945381	1.32282810	1.40263073	1.36330749	1.2102152	0.35111041
##	V2	-0.48990043	-0.49284058	0.02529414	-0.03644906	0.3390425	-0.42691677
##	V3	2.44175537	2.11086547	1.70473410	1.50551003	1.1937048	2.70234204
##	V4	-0.48982361	-0.50344441	-0.28709451	0.05889579	0.3108468	-0.42673955
##	V5	0.03104707	-0.04302498	-0.13878383	-0.15295151	-0.3089048	0.08539285
##	V6	-0.49031958	-0.57503327	-0.72915953	-0.80217694	-0.9328169	-0.42719889
##		p276	p280	p284	p288	p292	p296
##	V1	0.92277974	1.35555378	1.3891833	1.32475871	1.3154915	0.33582998
##	V2	-0.50274059	-0.36798235	-0.1223233	0.51282662	0.2196578	-0.36168623
##	V3	2.39822913	2.05952480	1.6846920	1.38142083	1.3026082	2.67464488
##	V4	-0.50267503	-0.53620551	-0.1552631	-0.07754806	0.2190545	-0.44896427
##	V5	0.01204097	-0.07183297	-0.1144260	-0.25310134	-0.2593445	0.07589785
##	V6	-0.50316705	-0.59979694	-0.7212711	-0.86985041	-0.8985865	-0.44946706
##		p300	p304	p308	p312	p316	p320
##	V1	0.811520535	1.4490096	1.34371743	1.2873154	1.19835368	0.4231612
##	V2	-0.467234573	-0.3505411	0.20458821	0.7182447	0.68318605	-0.1391174
##	V3	2.336765536	1.9599627	1.57015950	1.3037101	1.15319464	2.4694948
##	V4	-0.467215010	-0.5435040	-0.08954341	-0.1221222	0.09666706	-0.5050590
##	V5	0.009323725	-0.1051837	-0.17300113	-0.2974570	-0.31518839	0.0094474
##	V6	-0.467684768	-0.6164903	-0.79793486	-0.8968138	-0.94357327	-0.5056351
##		p324	p328	p332	p336	p340	p344
##	V1	0.88857281	1.4847840	1.28771865	1.1387116	1.1270725	0.43289230
##	V2	-0.20948635	-0.1826015	0.52282726	1.0286860	0.8827097	0.18273190
##	V3	2.24417611	1.8704623	1.48931179	1.2057669	1.0873058	2.27767773
##	V4	-0.55988085	-0.5949365	-0.08758112	-0.1222143	0.1538538	-0.56307378
##	V5	-0.06184231	-0.1633019	-0.24340626	-0.3458664	-0.3572301	-0.08130758
##	V6	-0.56046136	-0.6630878	-0.88591727	-0.9364350	-0.9811557	-0.56371056
##		p348	p352	p356	p360	p364	p368
##	V1	0.6784133	1.3764959	1.2695750	1.06425075	1.0048261	0.4035943
##	V2	0.4060317	0.3078051	0.6656450	1.09320128	1.0390658	0.7787016
##	V3	2.0683696	1.7610705	1.3835944	1.15640784	1.0658983	1.9222759
##	V4	-0.6297237	-0.7250634	-0.2827334	-0.07357238	0.2449797	-0.6354562
##	V5	-0.1664665	-0.2454578	-0.2765723	-0.34926808	-0.3680049	-0.1950879
##	V6	-0.6303971	-0.7257389	-0.8606369	-0.95010346	-1.0051074	-0.6361806
##		p372	p376	p380	p384	p388	p392
##	V1	0.5925997	1.2030236	1.1359643	1.03679847	0.9077784	0.3374290

##	V2	0.8387527	0.8177331	0.9061767	1.09325183	0.9862788	1.1452596
##	V3	1.8354296	1.5032403	1.2562672	1.17165088	0.9942570	1.7236640
##	V4	-0.6807384	-0.6625800	-0.1972912	-0.02044064	0.4277329	-0.6643472
##	V5	-0.2401655	-0.3177405	-0.3138871	-0.35384093	-0.3727160	-0.2561962
##	V6	-0.6814823	-0.8088581	-0.9032856	-0.96766505	-1.0126028	-0.6651061
##		p396	p400	p404	p408	p412	p416
##	V1	0.6490553	1.1305293	1.0334718	0.9418779	0.8994264	0.4128041
##	V2	1.1926364	1.0375123	1.0783948	1.1324770	0.9683765	1.3662583
##	V3	1.5673814	1.3451952	1.1664187	1.0736724	0.9351185	1.5351019
##	V4	-0.7243138	-0.5943148	-0.1738289	0.2628606	0.3907086	-0.6935703
##	V5	-0.3197190	-0.3435498	-0.3267943	-0.3561740	-0.4165232	-0.3100522
##	V6	-0.7250817	-0.8386670	-0.9134082	-1.0227271	-1.0151651	-0.6943338
##		p420	p424	p428	p432	p436	p440
##	V1	0.7738098	1.0844577	0.95858698	0.9068304	0.7726576	0.4319013
##	V2	1.3209107	1.1559114	1.12971297	1.1483142	0.9297808	1.4047706
##	V3	1.4329564	1.2401623	1.12750434	1.0731179	0.8337548	1.4655008
##	V4	-0.7173577	-0.4578534	-0.01980659	0.2943665	0.4628123	-0.6569827
##	V5	-0.3530591	-0.3631306	-0.33051237	-0.3662961	-0.4445494	-0.3295892
##	V6	-0.7765441	-0.8748282	-0.94462738	-1.0319015	-0.9901437	-0.7104356
##		p444	p448	p452	p456	p464	p468
##	V1	0.9209136	1.0827691	0.8922643	0.8520348	0.5292497	1.0191985
##	V2	1.3039972	1.1502343	1.2116127	1.0875830	1.4165522	1.2580756
##	V3	1.3469107	1.1431900	1.0726037	0.9886217	1.4290547	1.2632105
##	V4	-0.6542146	-0.3064796	0.1343138	0.4397566	-0.5559581	-0.5321220
##	V5	-0.3779175	-0.3560285	-0.3600412	-0.4163794	-0.3522729	-0.3898630
##	V6	-0.8220956	-0.8988550	-0.9939600	-1.0598436	-0.7734164	-0.8648354
##		p472	p476	p480	p484	p488	p492
##	V1	1.02430427	0.8410526	0.7497950	0.4083877	0.7640039	1.0793594
##	V2	1.17114290	1.2405422	0.9880206	1.4514255	1.3497128	1.1836804
##	V3	1.09202148	0.9721961	0.9233902	1.3826485	1.3481088	1.1259051
##	V4	-0.09917706	0.2721030	0.4377685	-0.5183866	-0.4560772	-0.1713554
##	V5	-0.35738411	-0.3818668	-0.4414103	-0.3585212	-0.3841273	-0.3829709
##	V6	-0.94335500	-1.0302312	-1.0340645	-0.7449339	-0.8487114	-0.9475868
##		p496	p508	p512	p516	p528	p532
##	V1	0.90197505	0.3421124	1.0388374	0.9545357	0.4424214	1.0505264
##	V2	1.26668539	1.4138470	1.2525058	1.2128406	1.3435882	1.2076398
##	V3	1.01571065	1.3720256	1.2015287	1.0374888	1.3540582	1.1431287
##	V4	0.03715049	-0.2936299	-0.4071008	0.1227654	-0.1048169	-0.1355797
##	V5	-0.40687119	-0.3537105	-0.3997935	-0.3967392	-0.3609175	-0.3926071
##	V6	-0.99315970	-0.7811236	-0.8957085	-1.0119423	-0.8586578	-0.9618774
##		p548	p552	p568	p572	p592	p608
##	V1	0.1469730	0.9355792	0.26492987	0.9948066	0.84842798	1.0019521
##	V2	1.2585035	1.2278129	1.19985909	1.1337262	1.20627091	1.0999529
##	V3	1.1675876	1.2205052	1.17326003	1.1439494	1.18741315	1.0606877
##	V4	0.1412461	-0.1617187	0.07574147	0.1139567	0.08267863	0.2730811
##	V5	-0.3990025	-0.3965238	-0.39729390	-0.3749642	-0.41850239	-0.4163684
##	V6	-0.8004347	-0.9396697	-0.82341470	-1.0009008	-0.98687470	-1.0413304
##		p620	p632	p640	p648		
##	V1	0.9799598	0.9616090	0.8309318	0.7261277		
##	V2	1.0156979	0.9828267	0.9738331	0.8524253		
##	V3	1.0236046	0.9775871	0.9550951	0.8590939		
##	V4	0.4279809	0.5121374	0.5072186	0.5192640		
##	V5	-0.4003193	-0.4062028	-0.4415392	-0.4597561		
##	V6	-1.0656666	-1.0763672	-1.0529811	-1.0022005		

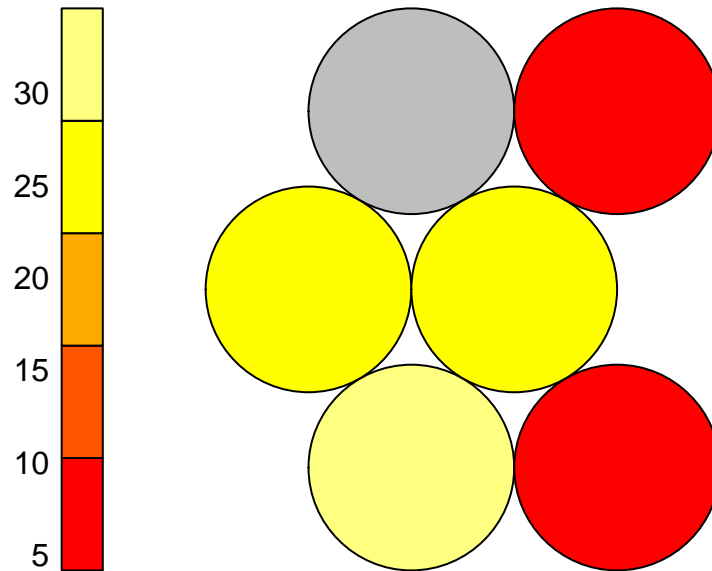
```
plot(som.BS, "codes")
```

## Codes plot



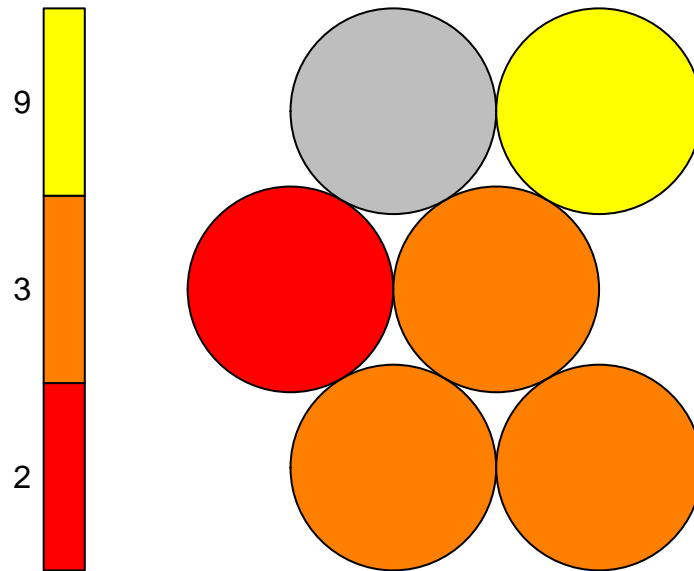
```
plot(som.BS, "quality")
```

## Quality plot



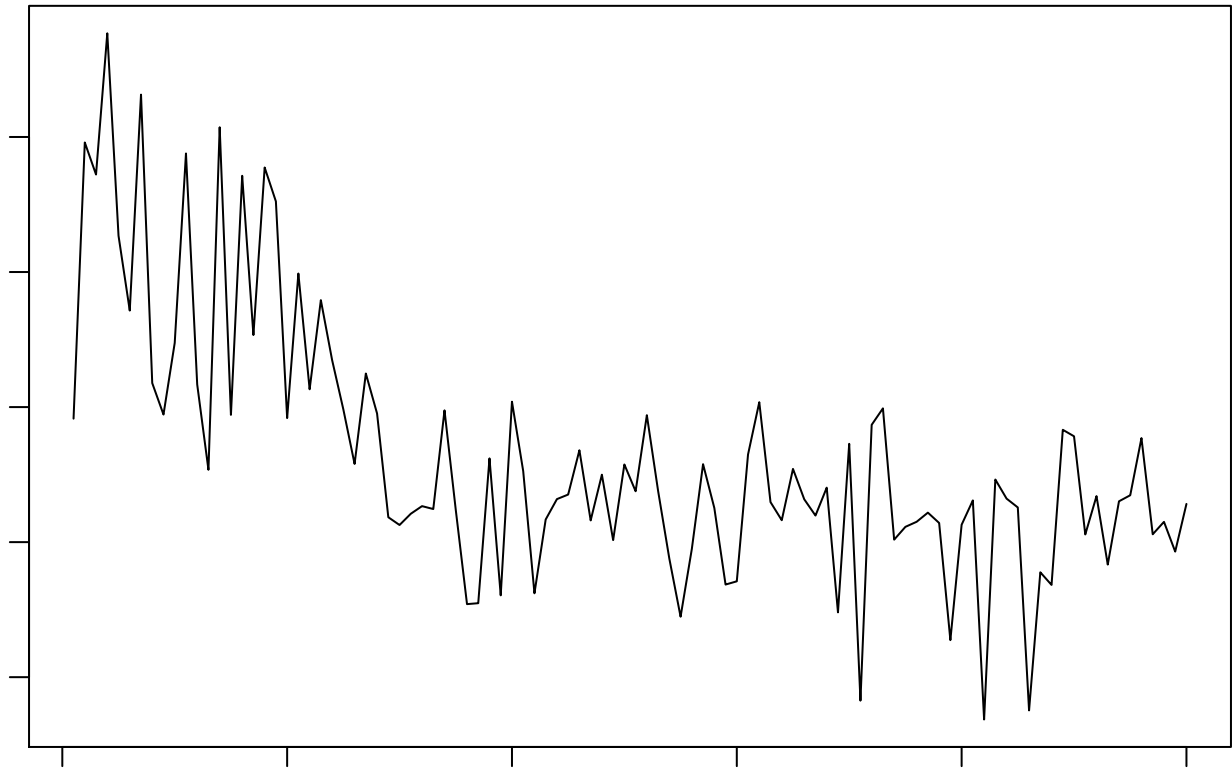
```
plot(som.BS, "counts")
```

## Counts plot



```
plot(som.BS, "changes")
```

## Training progress



```
plot(som.BS, type="dist.neighbours")
```

Neighbour distance plot

