

*SYNOPTIC CLIMATOLOGY OF  
NORTH SEA STORMS  
AND RETURN PERIOD  
SURGE ANALYSIS*

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## *A I M S*

*This project will seek to provide new information in respect of the prediction of severe storm surges in the North Sea. The research will provide new analysis of what is meant by a 1:50 year and a 1:100 year return period for a major surge. The proposed research seeks to adopt a new approach to understand the frequency and magnitude of severe storm surges in the North Sea and also seeks to provide predictive data that will be of use to the insurance industry, planners and coastal engineers.*

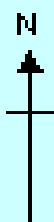
## *DELIVERABLES*

### *Report containing:*

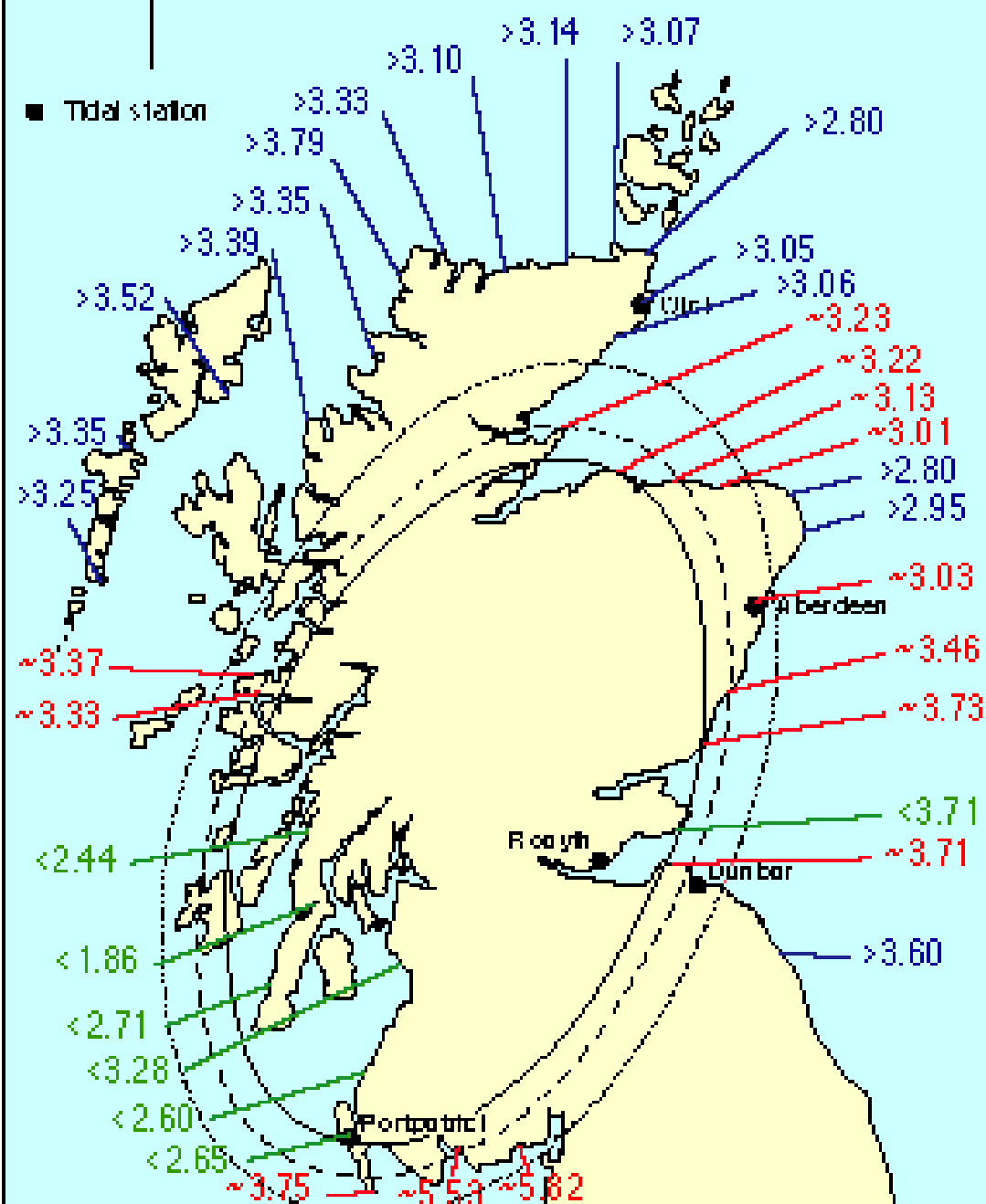
- *Time intervals associated with the steering of storms causing North Sea surge.*
- *Frequency and magnitude of North Sea storm surges over 700 years.*
- *Return periods for major storms in the North Sea.*
- *Surge elevations for stations along the eastern coastline of the UK linked to future sea level scenario data.*

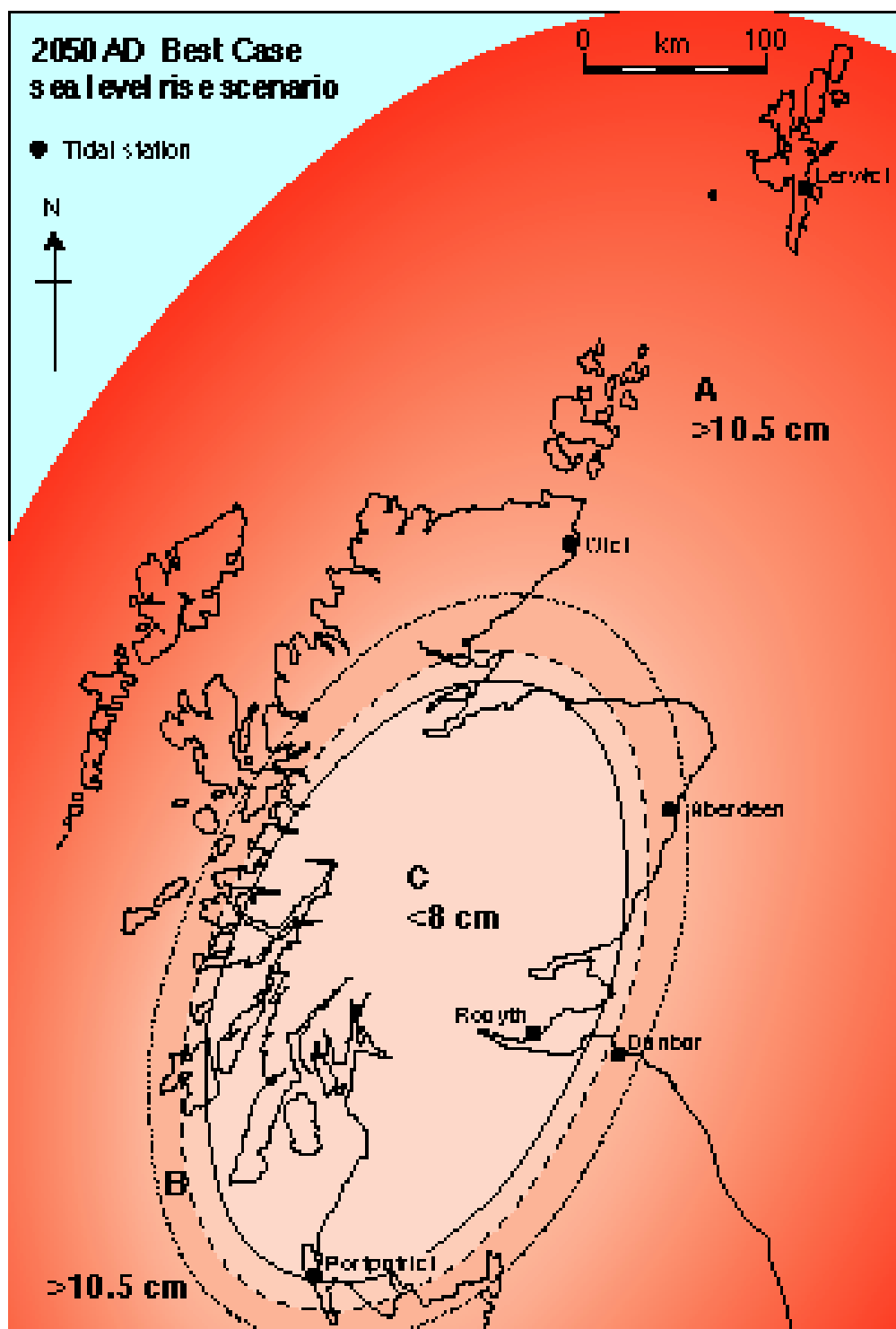
**2050 AD Best Estimate scenario of  
sea level rise plus estimated 1:50 yr  
surge (m) relative to mean sea level**

0 km 100

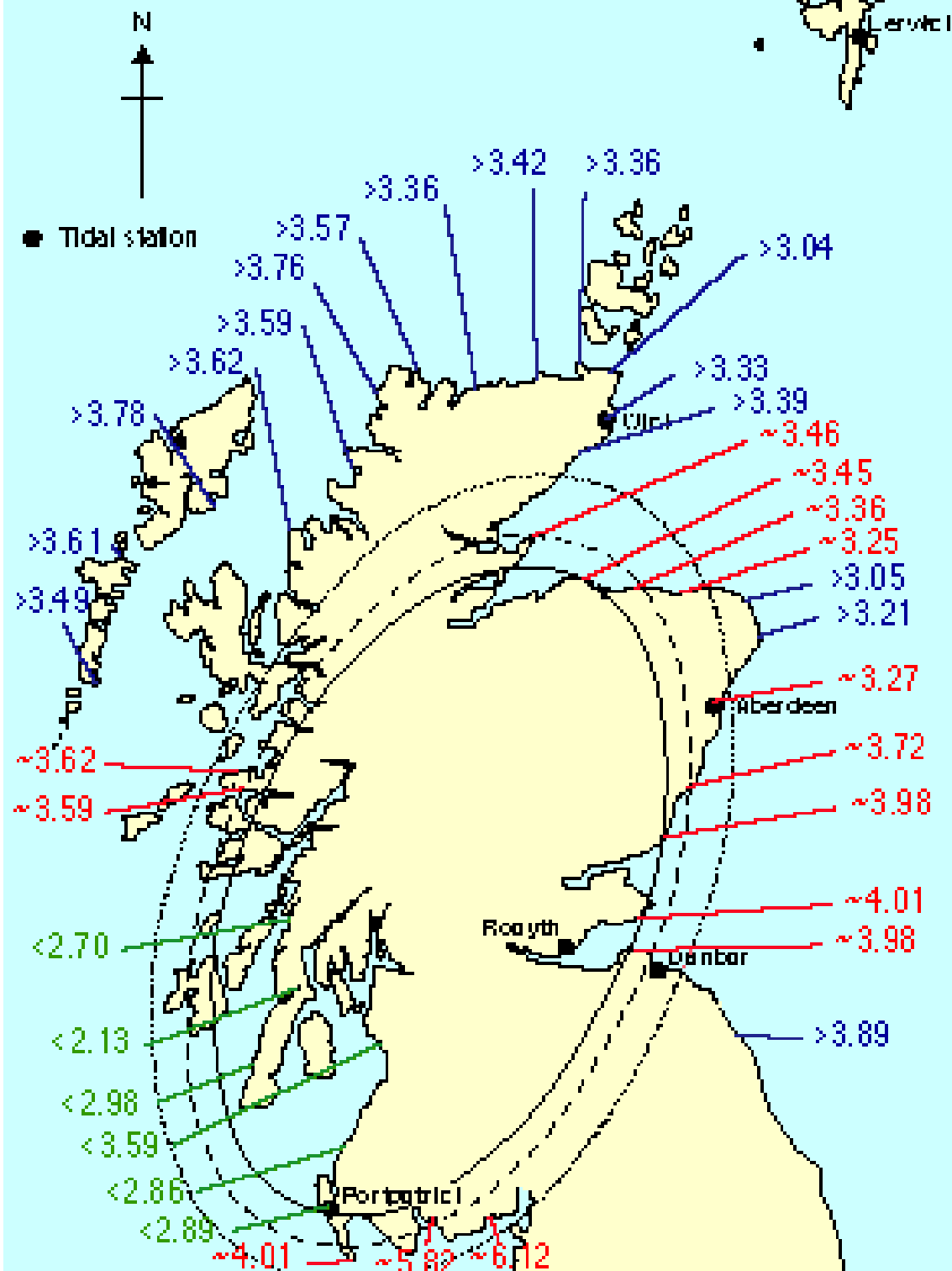


■ Tidal station

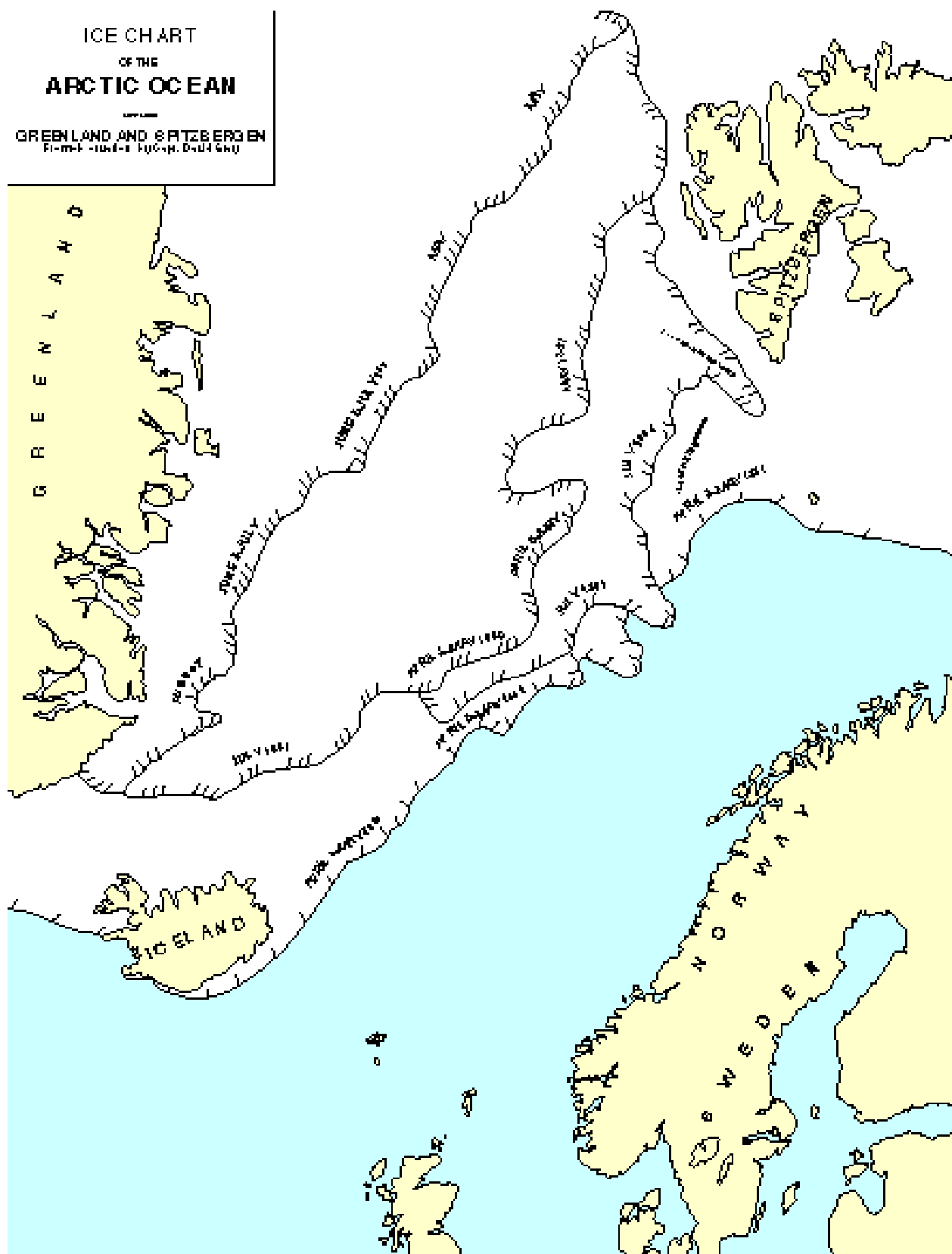




**2100 AD Best Estimate scenario of sea level rise plus estimated 1:100 yr surge (m) relative to mean sea level**



**GREENLAND AND SATZBERGEN**  
Firmly - 104-1-8 196-1-8 196-1-8 196-1-8



## NAO Index

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AV
1963	-4.2	-1.96	2.77	-0.43	2.04	-1.44	-0.24	-0.77	0.97	2.77	-0.22	-3.16	-0.32
1964	0.87	-0.18	-0.79	0.96	2.56	-1.47	2.7	-2.27	0.54	0.61	1.21	-1.32	0.28
1965	-0.08	-3.08	0.22	2.15	0.01	1.15	-1.3	1.8	-0.98	-1.3	-1.87	1.14	-0.18
1966	-1.1	-0.42	1.03	1.19	1.59	1.1	-1.43	-1.84	-0.44	-2.93	-0.16	1.59	-0.15
1967	-0.03	1.65	2.98	-0.73	-0.33	2.18	1.7	-0.22	0.35	1.31	-0.93	-0.62	0.61
1968	1.59	-1.59	0.32	-0.69	-1.38	1.22	-1.69	-1.26	0.54	0	-1.99	-1.81	-0.56
1969	-1.74	-3.23	-1.83	1.12	-0.14	-0.8	3.81	-1.43	0.42	0.67	-1.31	-0.35	-0.4
1970	-1.28	1.06	-1.8	2.52	1.95	0.17	0.68	0	0.5	-0.03	0.66	-1.67	0.23
1971	-0.28	1.31	-1.72	-3.15	-0.74	-1.93	-1.72	-0.33	-0.61	1.7	-1.29	0.93	-0.65
1972	-0.38	-0.12	0.3	0.19	0.98	0.55	-0.27	-0.28	-4.19	-1.68	0.77	2.28	-0.15
1973	1.56	1.31	1.08	-2.64	0.1	0.29	-2.34	1.94	-0.86	-0.96	-0.16	-1.47	-0.18
1974	3.94	0.78	-0.77	-2.32	-0.22	-0.67	1.23	0.5	0.05	-1.38	1.38	3.22	0.48
1975	2.62	0.49	-1.22	-0.88	-2.59	-0.43	-0.05	-0.31	1.69	0.46	0.98	-1.39	-0.05
1976	0.93	1.39	1.92	-1.55	0.99	1.16	-1.27	0.24	-3.53	-0.58	1.6	-3.44	-0.18
1977	-2.22	0.38	1.37	1.03	-1.82	-1.46	-1.74	-1.82	1.58	0.51	0.5	-0.08	-0.31
1978	0.62	-1.91	3.14	-3.14	0.16	-0.42	-1.08	-0.34	1.91	0.08	3.95	-1.9	0.09
1979	-3.09	-0.53	0.58	-0.83	0.7	-0.12	1.6	-1.25	1.06	-1.9	2.06	2.24	0.04
1980	-1.65	0.8	-0.64	0	-2.43	-0.77	-1.6	-0.09	1.66	-0.81	-1.9	1.71	-0.48
1981	1.2	1.13	0.05	-3.06	-0.17	-2.1	0.9	0.62	0.2	-1	1.71	-2.02	-0.21
1982	-0.55	2.35	1.7	-1.01	0.81	-2.42	-1.29	1.06	1.02	0.39	1.84	2.81	0.56
1983	5.05	-1.16	1.83	-1.04	-0.78	-0.03	-1.31	0.17	-0.71	2.13	-2.09	1	0.25
1984	2.72	1.83	-2.08	0.3	-2.43	-0.29	0.09	0.61	-1.38	1.73	-0.94	1.69	0.15
1985	-2.73	-0.15	0.11	0.31	-2.26	-1.62	0.34	1.94	-0.06	0.21	-2.65	-0.26	-0.57
1986	1.64	-3.94	2.9	-0.96	1.89	-1.79	0.14	-2.6	-1.4	2.34	3.49	3.58	0.44
1987	-1.96	-0.14	0.33	2.54	-1.05	-1.19	-1.79	-3.39	1.21	-0.74	-0.51	-0.63	-0.61
1988	0.69	-0.01	0.82	-2.42	-1.39	-3.18	0.72	0.32	0.74	-1.96	-1.3	2.02	-0.41
1989	3.74	3.72	2.49	-0.5	0.91	-1.07	-0.21	1.35	-1.03	0.94	-2.74	-2.05	0.46
1990	3.69	5.22	3.16	1.74	-1.42	-0.16	0.63	2.93	-1.06	-0.54	-1.32	0.52	1.12
1991	2.06	0.07	-1.33	1.44	-0.32	-0.9	-0.94	2.31	-1.18	-1.71	1.79	1.4	0.22
1992	0.83	3.29	1.7	1.28	0.56	-2.24	0.31	3.59	0.93	-3.28	4.57	0.39	0.99
1993	4.11	0.21	1.51	0.8	-2.74	-0.43	-0.19	0.36	-2.67	-4.07	0.95	2.34	0.02
1994	1.46	0.17	3.72	1.33	-1.59	2.36	-0.61	-1.99	-2.92	-1.82	1.78	3.02	0.41
1995	2.89	3.24	1.1	-1.85	-0.59	-3.82	-1.49	-1.74	-1.61	1.29	-2.57	-3.15	-0.69
1996	-3.16	-0.02	-2.53	-0.34	-1.68	0.79	0.68	-0.59	-2.3	-0.01	0.06	-4.51	-1.13
1997	-1.8	5.37	2.13	-1	-1.55	-4.48	0.38	1.39	-0.74	-2.2	-0.78	-0.02	-0.28



