AN ATLAS OF HIGH-DISPERSION CAMERA ARTIFACTS

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Camera artifacts are artificial emission emission features that appear in every long IUE exposure. They resemble cosmic-ray hits, which can be detected in background regions by inspection of the raw images and in spectral regions by comparing more than one image of the same target. Camera artifacts are more difficult to identify than cosmic-ray hits, because they appear on every exposure that is greater than about one hour. The best way to identify camera artifacts is to study sky-background spectra, since the only "real" feature in these spectra should be geocoronal Lα at 1216 Å in the SWP region.

A detailed study of camera artifacts in low-dispersion IUE spectra was presented by Crenshaw, Bruegman, & Norman (1990). Plots of averaged sky-background spectra were presented to aid scientists in the identification of these features in their low-dispersion spectra. The spectra were also made available through the IUEDAC procedure called "ARTIFACT"".

This article presents plots of the artifacts found in high-dispersion sky-background spectra. Although these spectra were processed with IUESIPS, it is expected that the artifacts will also be present at the same approximate locations in NEWSIPS spectra, although their character may be altered somewhat (Bruegman & Crenshaw 1992). This high-dispersion atlas, together with the low-dispersion atlas in Crenshaw, Bruegman, & Norman (1990), should be useful for identifying camera artifacts in all IUE spectra.

The following figures present spectra of the artifacts for each order of each functional camera (SWP, LWP, LWR). The spectra are plotted in absolute flux units to allow direct comparison with science spectra. The noise is magnified at the ends of many orders, due to the large ripple corrections – no attempt has been made to identify artifacts in noisy regions. This effect is also present in science data, and is overcome by using data in the same wavelength region from another order.

Table 1 gives the postions and strengths of the strong high-dispersion artifacts that were detected. The *measured* positions are accurate to 0.1 – 0.2 Å for the SWP spectra and 0.2 – 0.3 Å for the LWP and LWR spectra. The *expected* positions of the artifacts in a particular science spectrum can be obtained by correcting the measured positions for the radial velocity shift that was applied to the science spectrum – this value can be found in the image header. As discussed in Crenshaw, Bruegman, & Norman (1990), the strengths of the artifacts depend on the background level and the previous history of exposures and preparation sequences. In general, the absolute flux levels can vary by a factor of $\sim$3.

This article is the only source for hard-copy plots of all of the high-dispersion sky-background spectra. More details on the reduction, analysis, and interpretation of the spectra can be found in an upcoming PASP paper (Crenshaw et al. 1996). In addition, the IUEDAC procedure ARTIFACT has been updated to return high-dispersion spectra for individual orders.

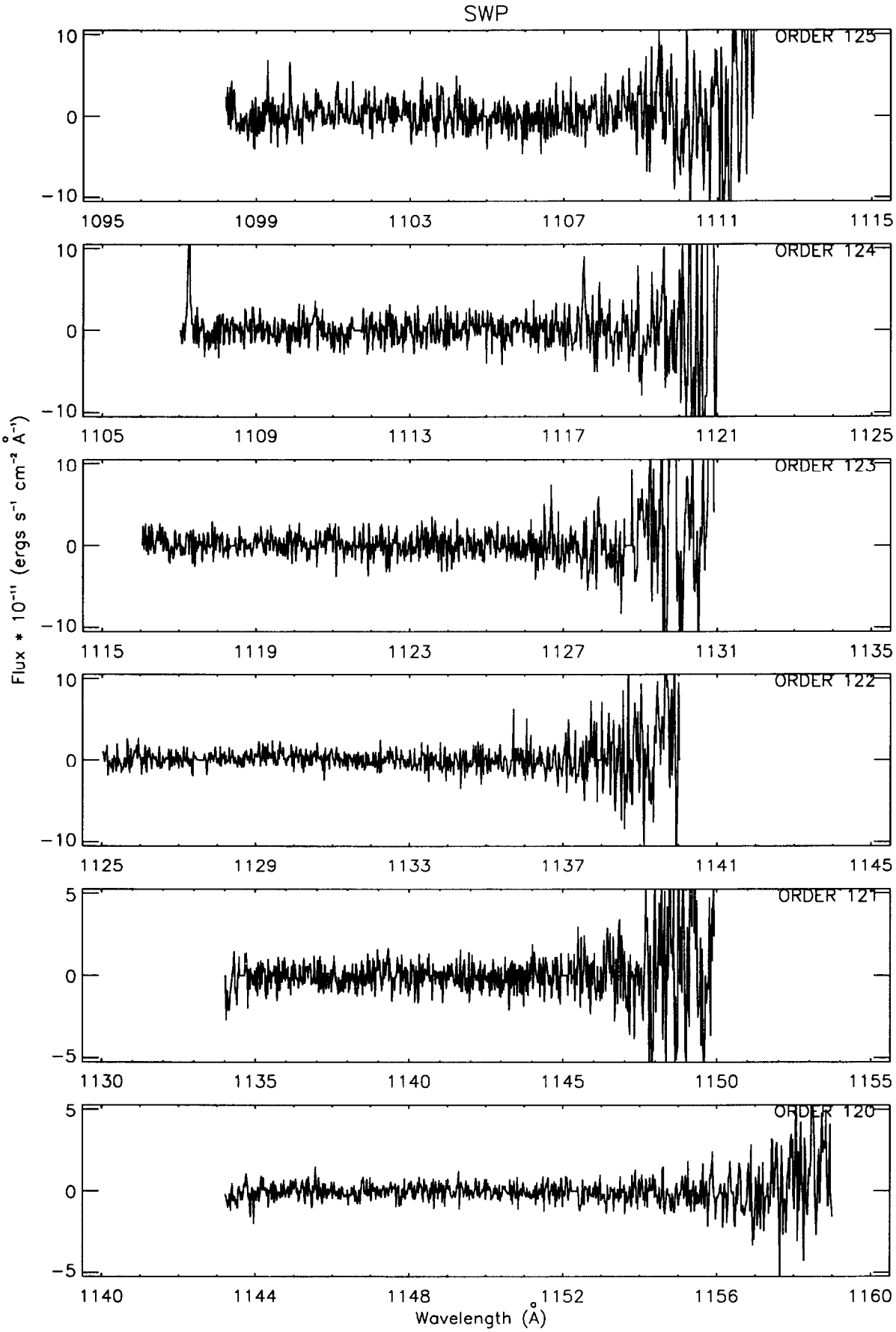
REFERENCES

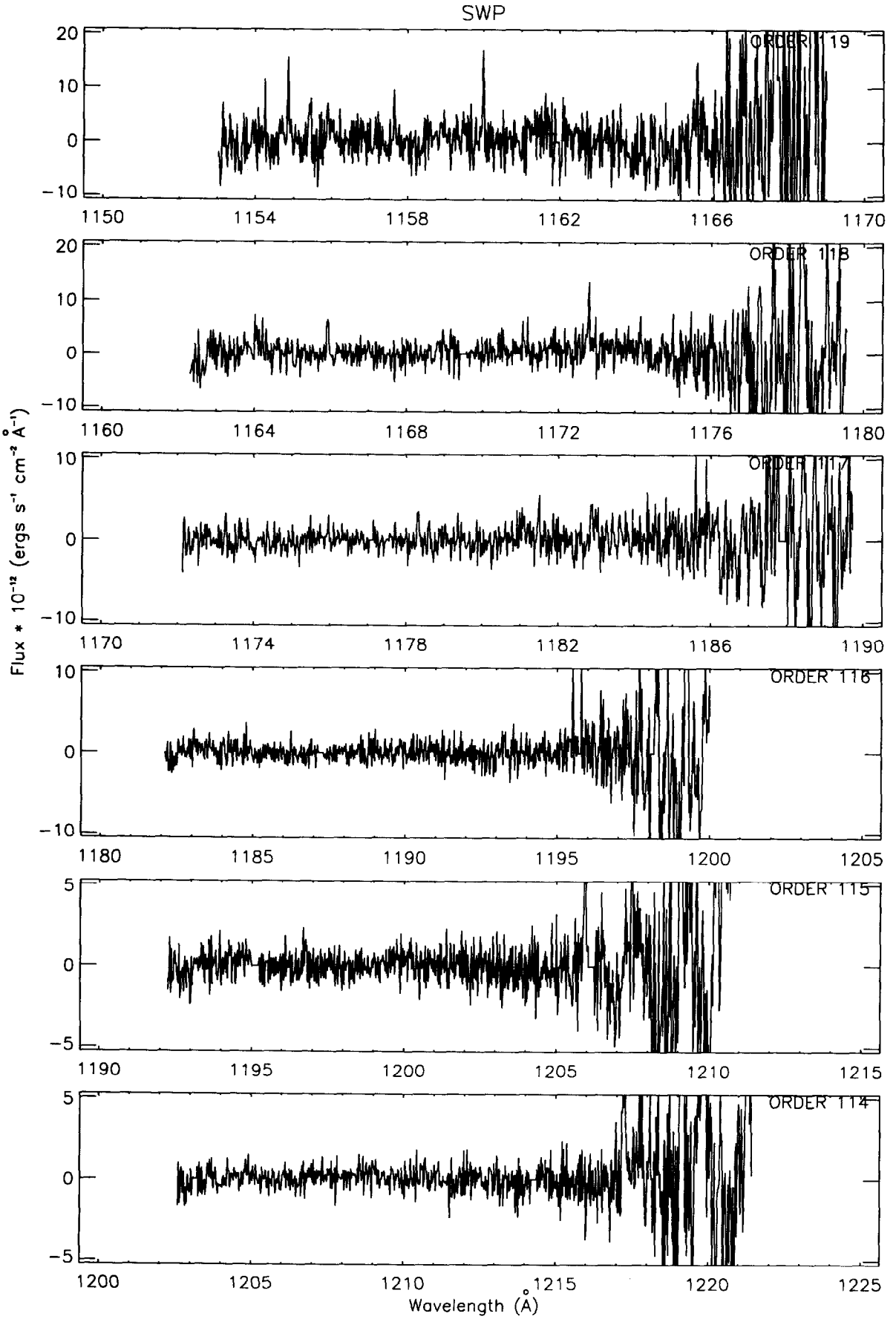
Bruegman, O.W. & Crenshaw, D.M. 1992, BAAS, 24, 1140
Crenshaw, D.M., Bruegman, O.W., Johnson, R., and Fitzurka, M. 1996, submitted to PASP
Crenshaw, D.M., Bruegman, O.W., & Norman, D.J. 1990, PASP, 102, 463

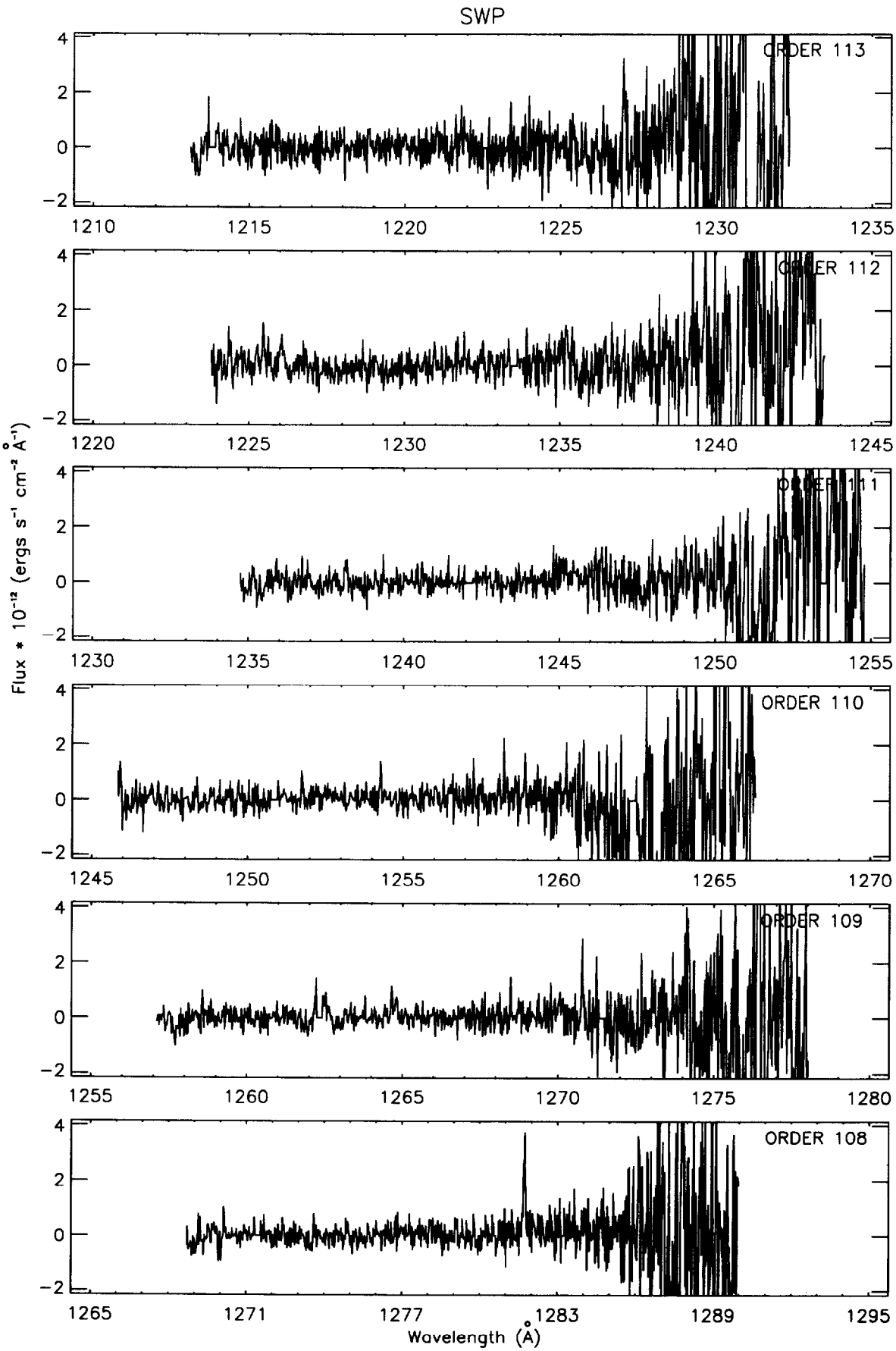
TABLE 1
IUE High-Dispersion Artifacts

SWP			LWP			LWR		
Order	λ (Å)	F_λ[a]	Order	λ (Å)	F_λ[a]	Order	λ (Å)	F_λ[a]
119	1154.9	16.	93	2483.3	1.1	122	1888.3	25.
119	1160.0	17.	80	2880.4	0.26	112	2067.3	1.4
118	1165.9	6.1				112	2074.4	1.7
118	1172.8	13.				107	2167.1	1.1
116	1195.5	12.				106	2171.7	1.7
116	1195.8	16.				100	2303.2	1.3
115	1205.9	9.6				100	2322.3	0.8
108	1281.7	3.7				94	2450.1	1.5
106	1298.6	1.0				93	2501.1	0.48
104	1320.8	1.0				87	2670.1	0.26
103	1337.8	0.7				86	2694.4	0.23
101	1369.8	1.9				84	2756.2	0.22
95	1453.6	1.7				82	2808.4	0.32
93	1474.3	1.6				82	2829.0	0.28
93	1481.8	1.1				80	2900.6	0.66
93	1483.0	1.6				77	3010.7	0.47
93	1487.7	1.6				76	3029.6	0.46
92	1500.9	1.9				75	3066.4	0.62
92	1504.8	3.0				75	3083.1	0.44
92	1505.5	2.3				75	3100.0	0.62
90	1540.0	3.5				72	3194.3	0.74
89	1549.3	0.9				72	3195.2	1.64
89	1552.0	1.7						
88	1566.5	1.4						
88	1573.0	1.8						
87	1577.9	1.1						
87	1583.9	1.9						
87	1593.2	2.1						
87	1593.5	1.9						
86	1598.5	0.9						
86	1603.6	1.0						
82	1691.1	1.1						
80	1725.9	1.1						
79	1755.5	0.80						
78	1757.7	0.40						
78	1762.4	0.57						
77	1790.1	0.38						
77	1795.5	0.80						
76	1810.1	0.71						
72	1914.3	0.25						
72	1916.0	0.31						
70	1975.0	0.25						
70	1980.6	0.33						
69	2005.0	0.26						
69	2009.5	0.46						
67	2059.1	0.25						
57	2059.5	0.39						

[a]Flux at peak in units of 10^{-12} ergs s^{-1} cm^{-2} $Å^{-1}$.


SWP
ORDER 125
ORDER 124
ORDER 123
ORDER 122
ORDER 121
ORDER 120
Flux * 10⁻¹¹ (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 119
ORDER 118
ORDER 117
ORDER 116
ORDER 115
ORDER 114
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 113
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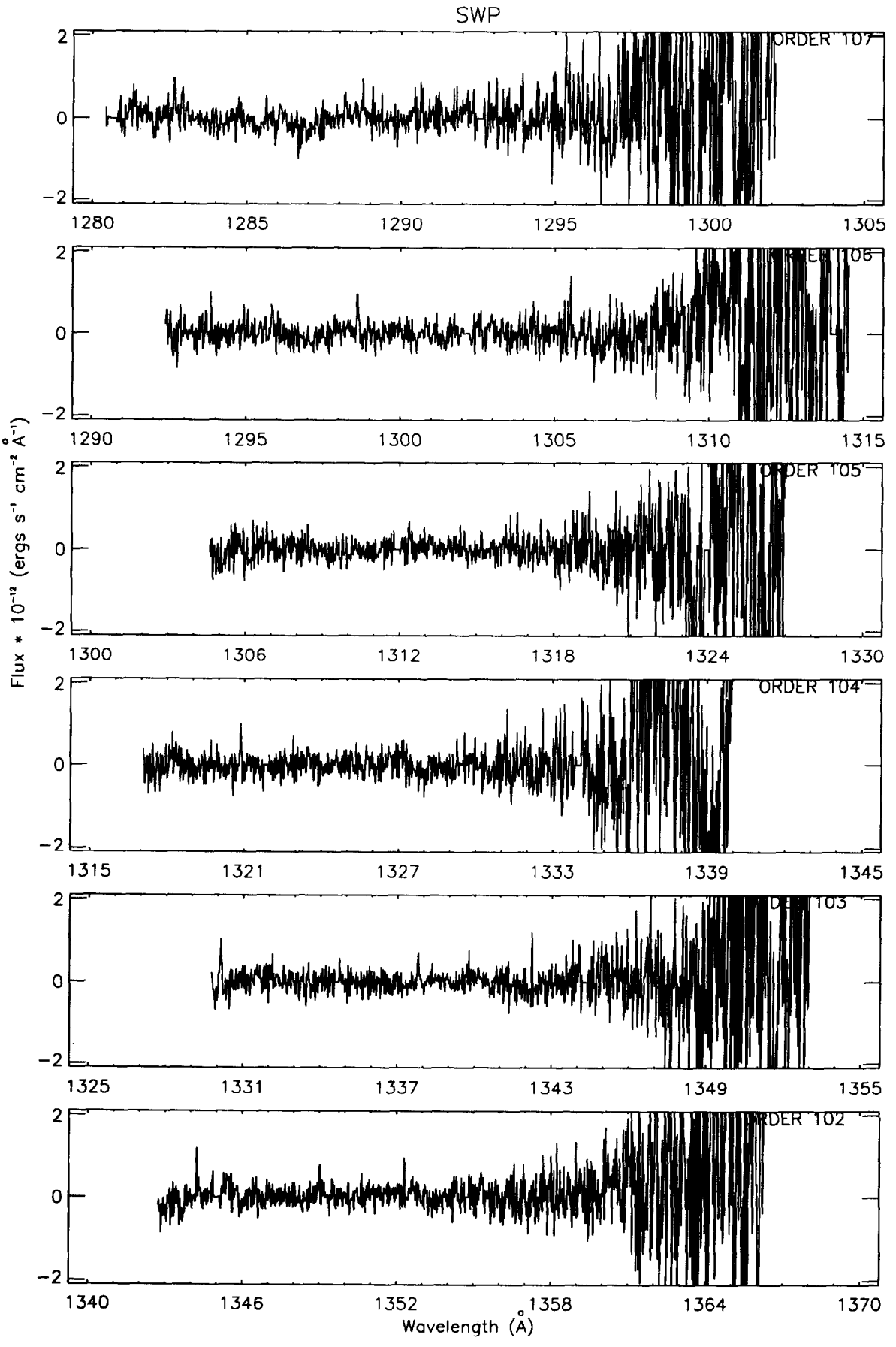
ORDER 111
ORDER 110
ORDER 109
ORDER 108
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 107
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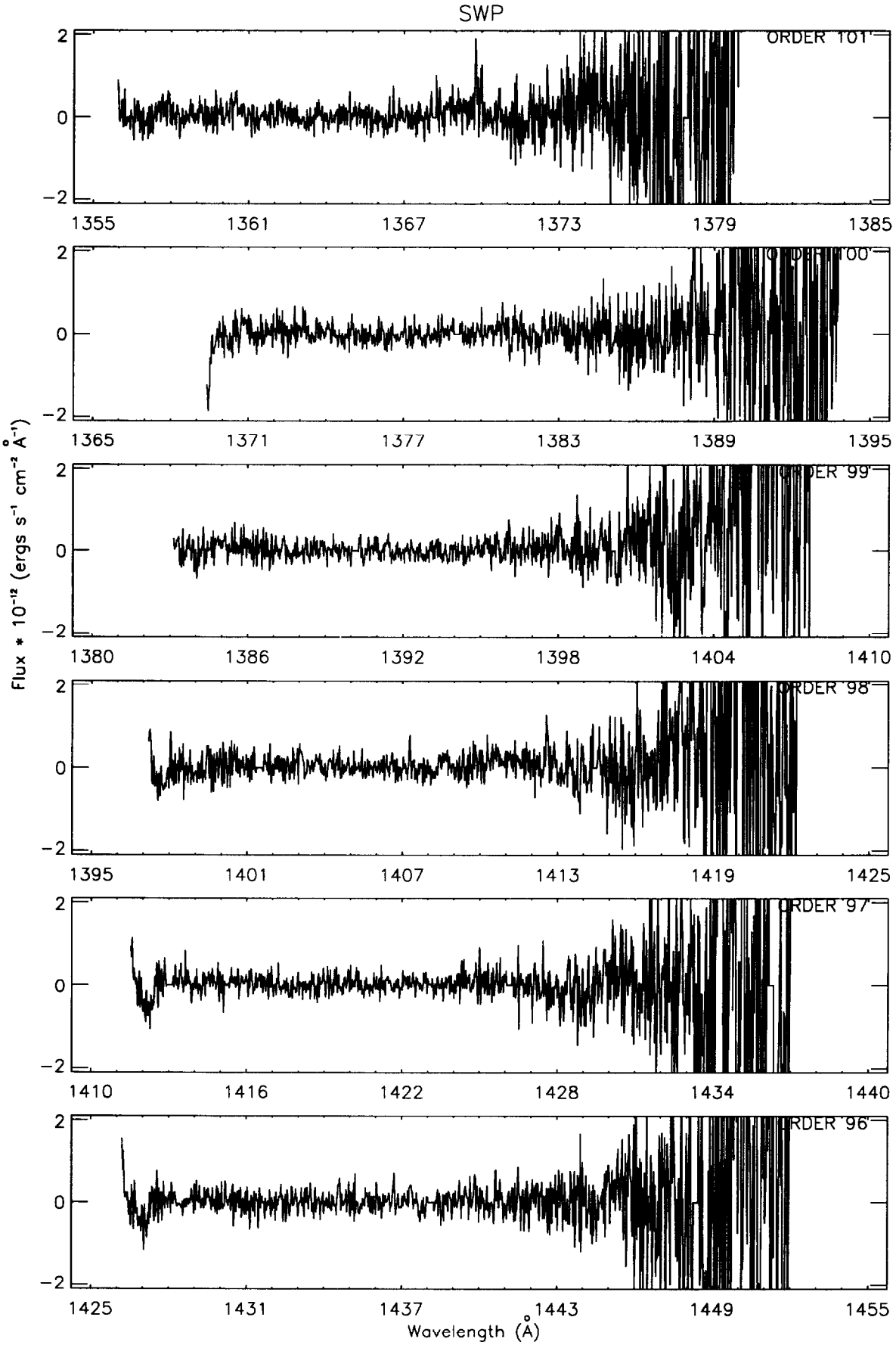
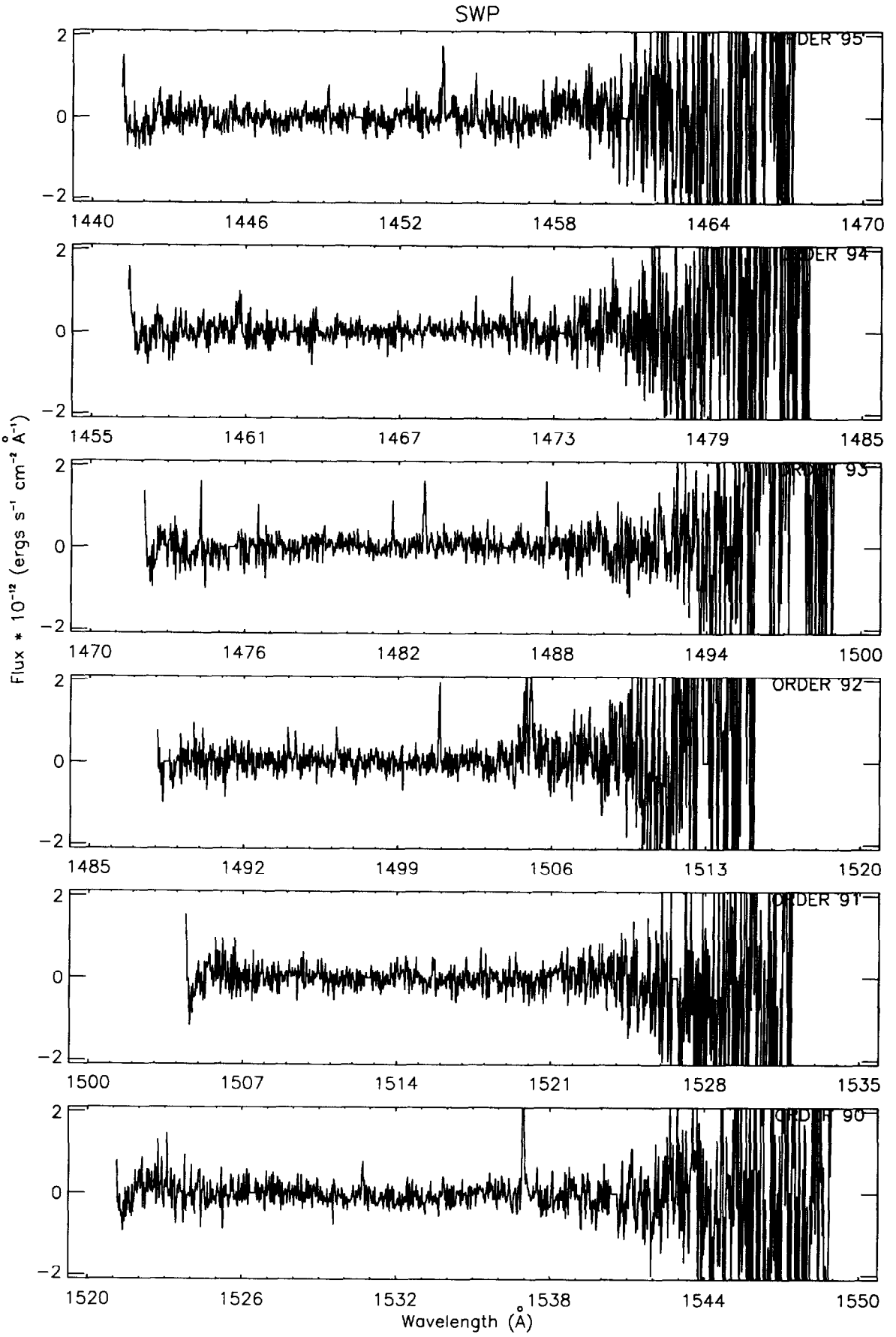
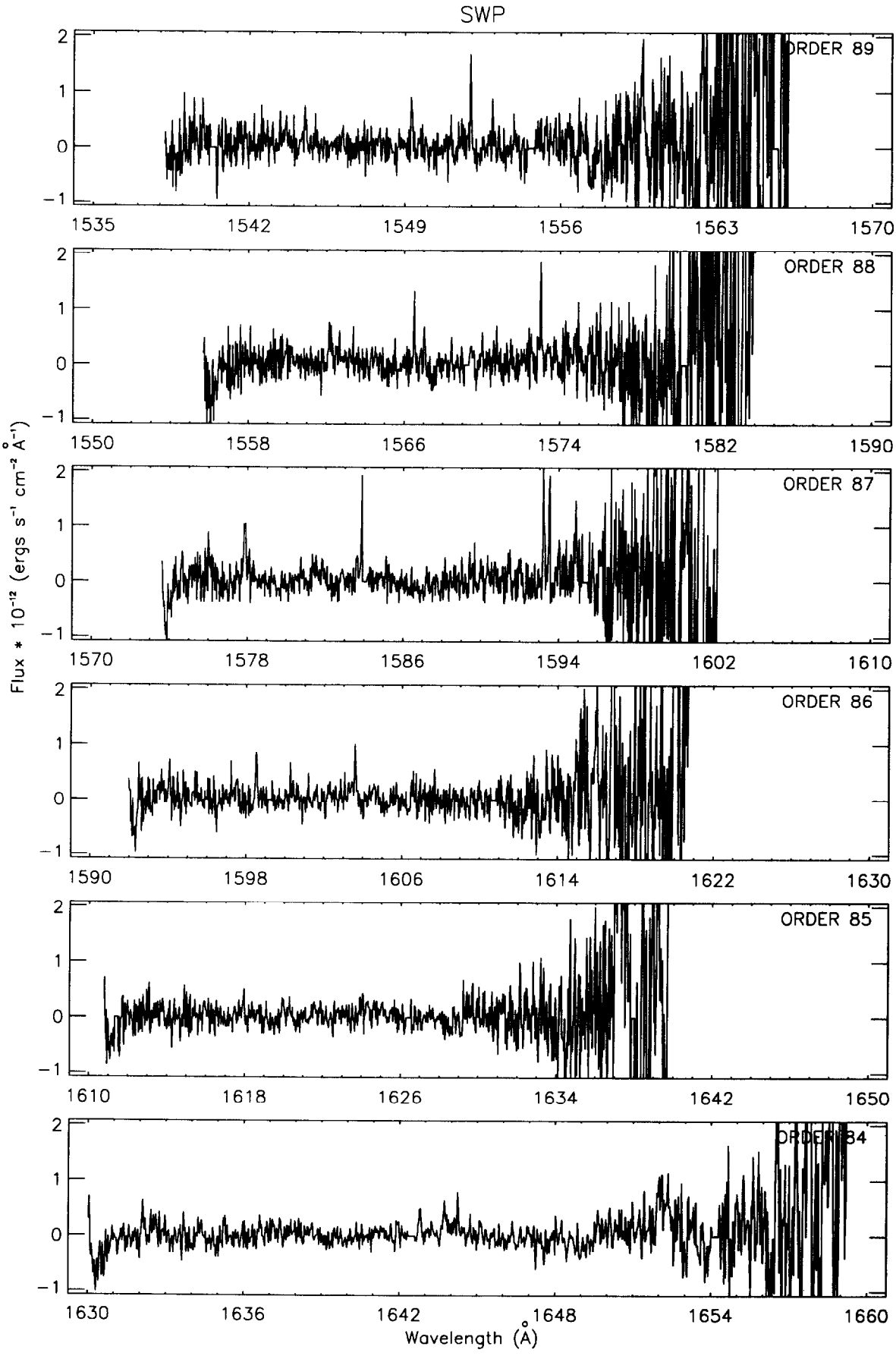
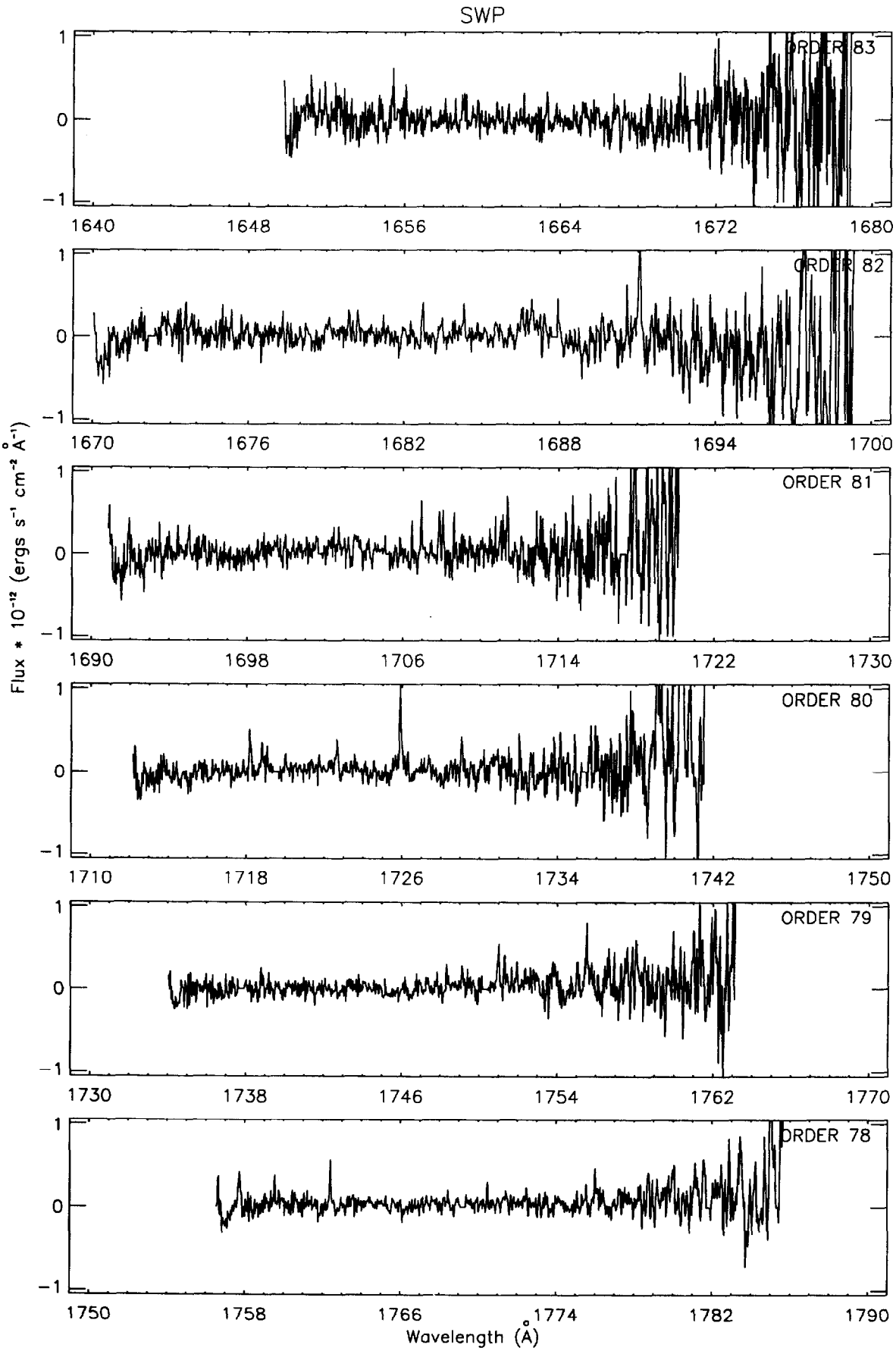
ORDER 104
ORDER 103
ORDER 102
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 101
ORDER 100
ORDER 99
ORDER 98
ORDER 97
ORDER 96
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 95
ORDER 94
ORDER 93
ORDER 92
ORDER 91
ORDER 90
2
0
−2
1440
1446
1452
1458
1464
1470
1455
1461
1467
1473
1479
1485
1470
1476
1482
1488
1494
1500
1485
1492
1499
1506
1513
1520
1500
1507
1514
1521
1528
1535
1520
1526
1532
1538
1544
1550
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 89
ORDER 88
ORDER 87
ORDER 86
ORDER 85
ORDER 84
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)
1535
1542
1549
1556
1563
1570
1550
1558
1566
1574
1582
1590
1570
1578
1586
1594
1602
1610
1590
1598
1606
1614
1622
1630
1610
1618
1626
1634
1642
1650
1630
1636
1642
1648
1654
1660


SWP
ORDER 83
ORDER 82
ORDER 81
ORDER 80
ORDER 79
ORDER 78
1640
1648
1656
1664
1672
1680
1670
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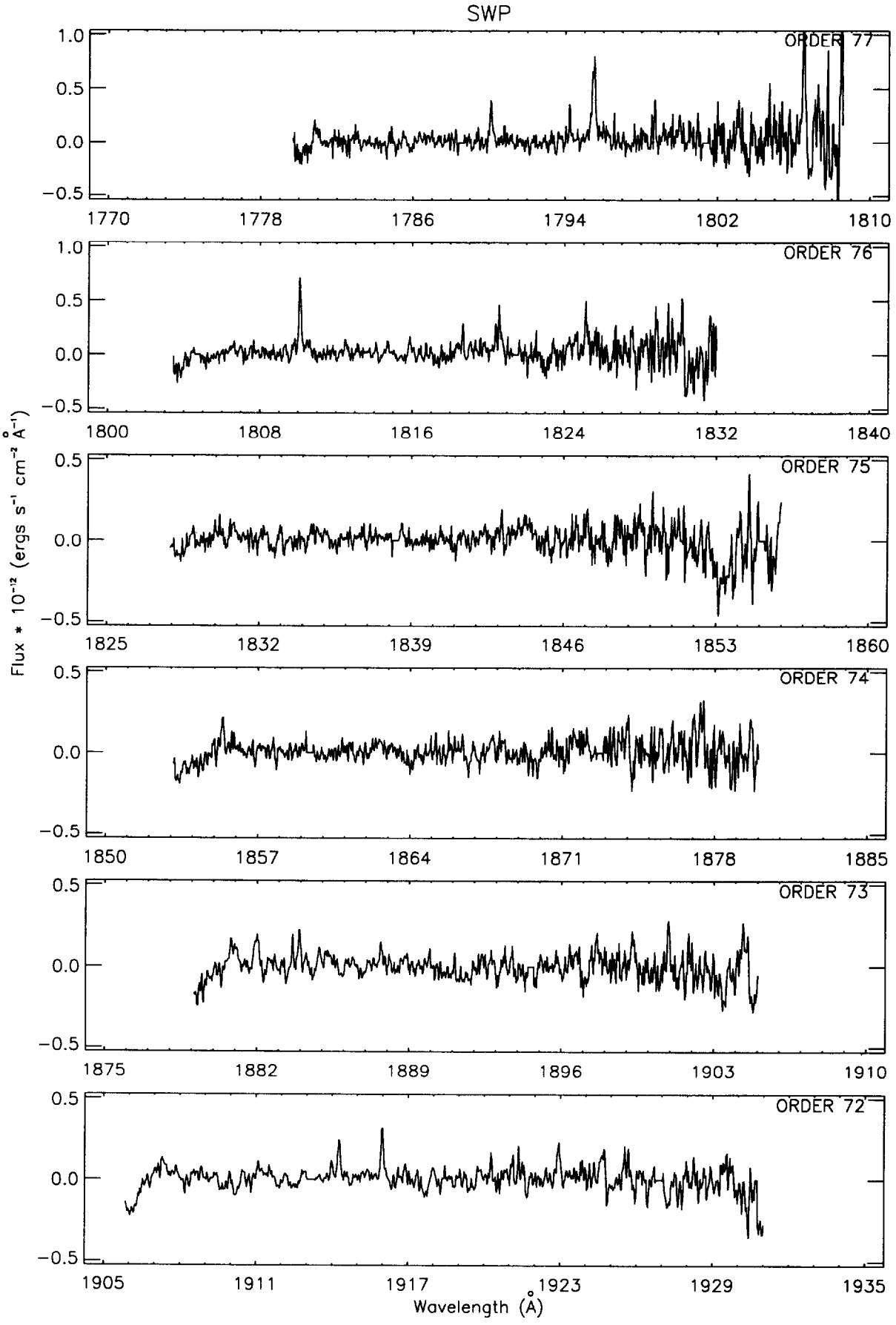
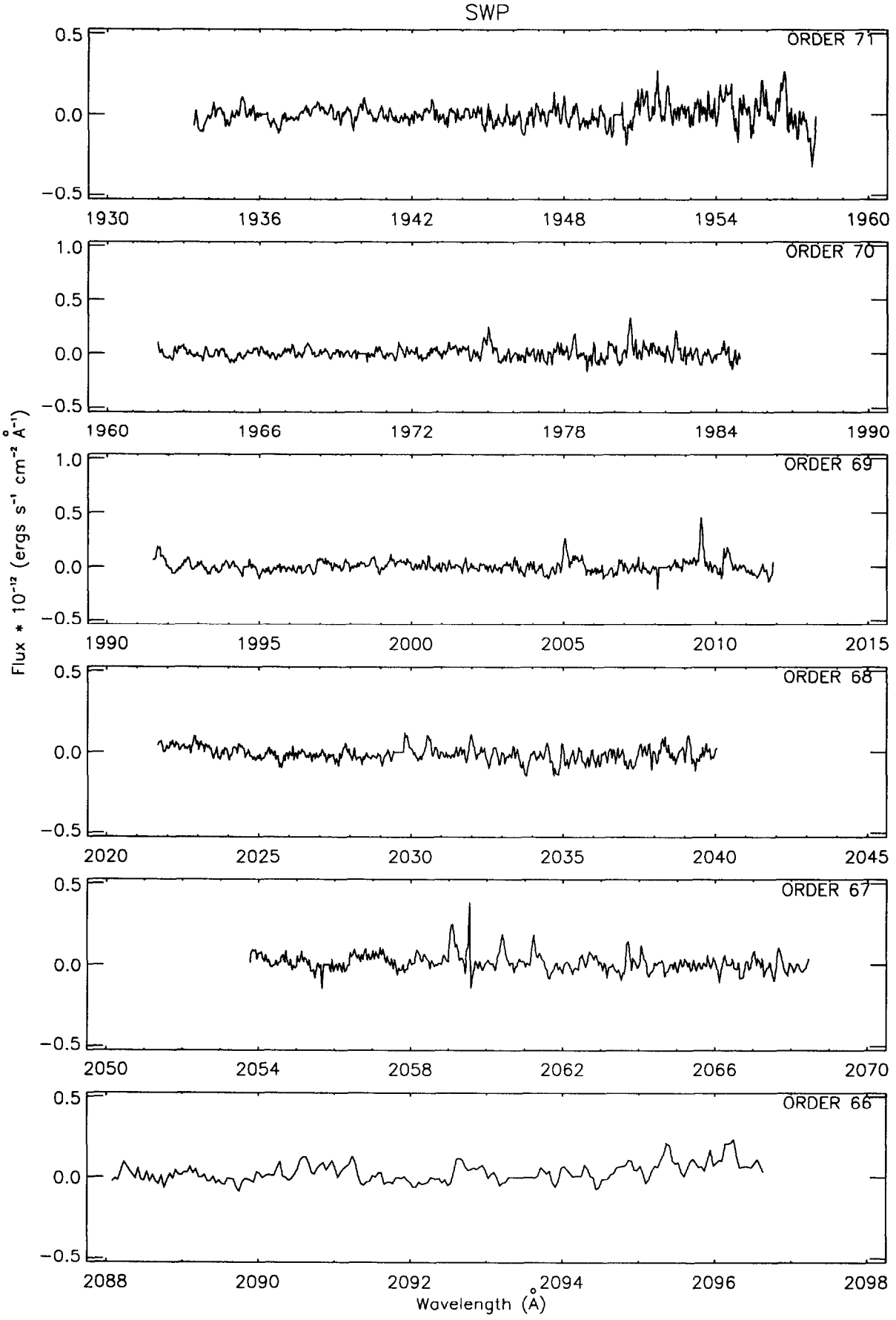
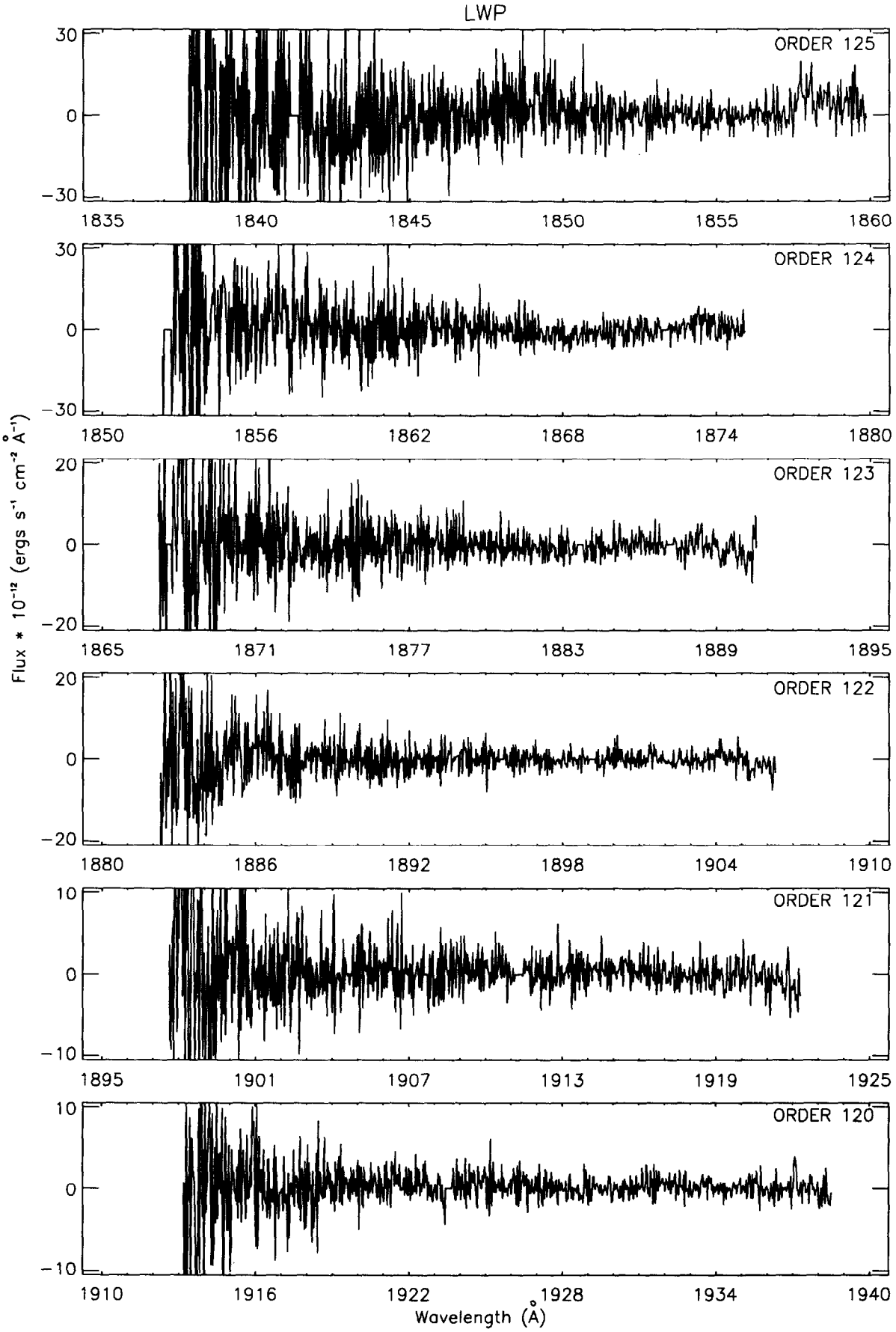
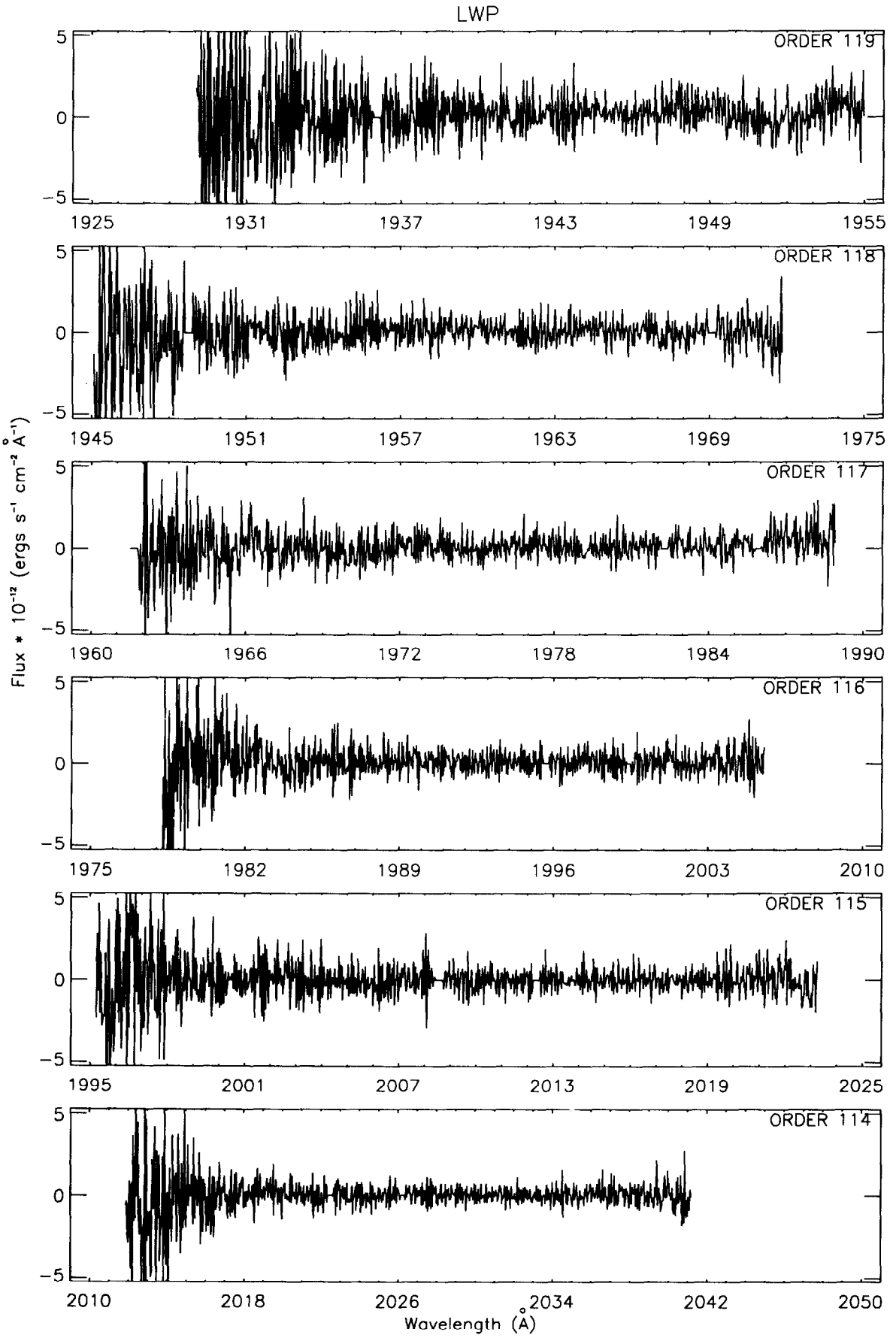
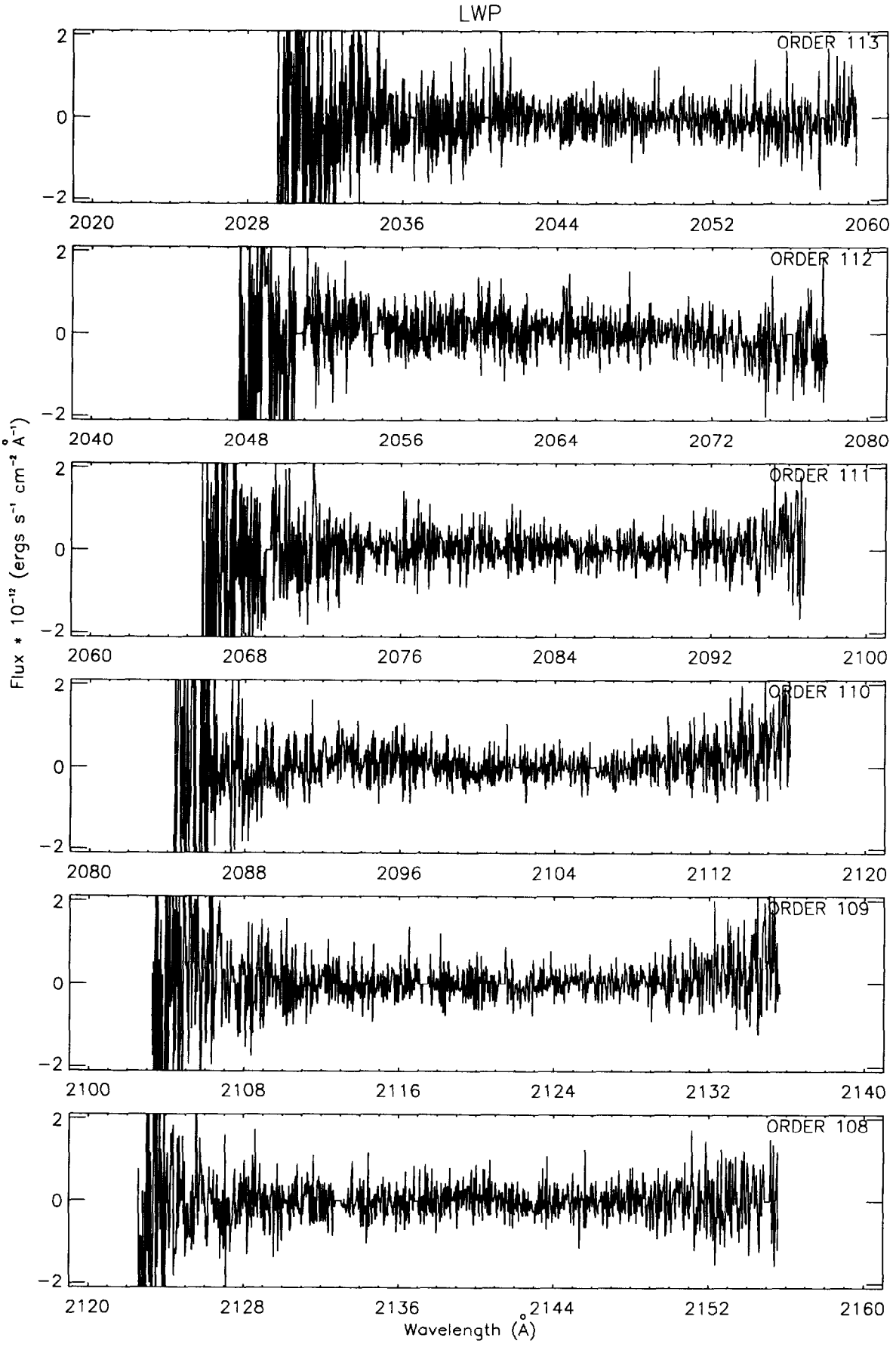
1682
1688
1694
1700
1690
1698
1706
1714
1722
1730
1710
1718
1726
1734
1742
1750
1730
1738
1746
1754
1762
1770
1750
1758
1766
1774
1782
1790
1
0
−1
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)

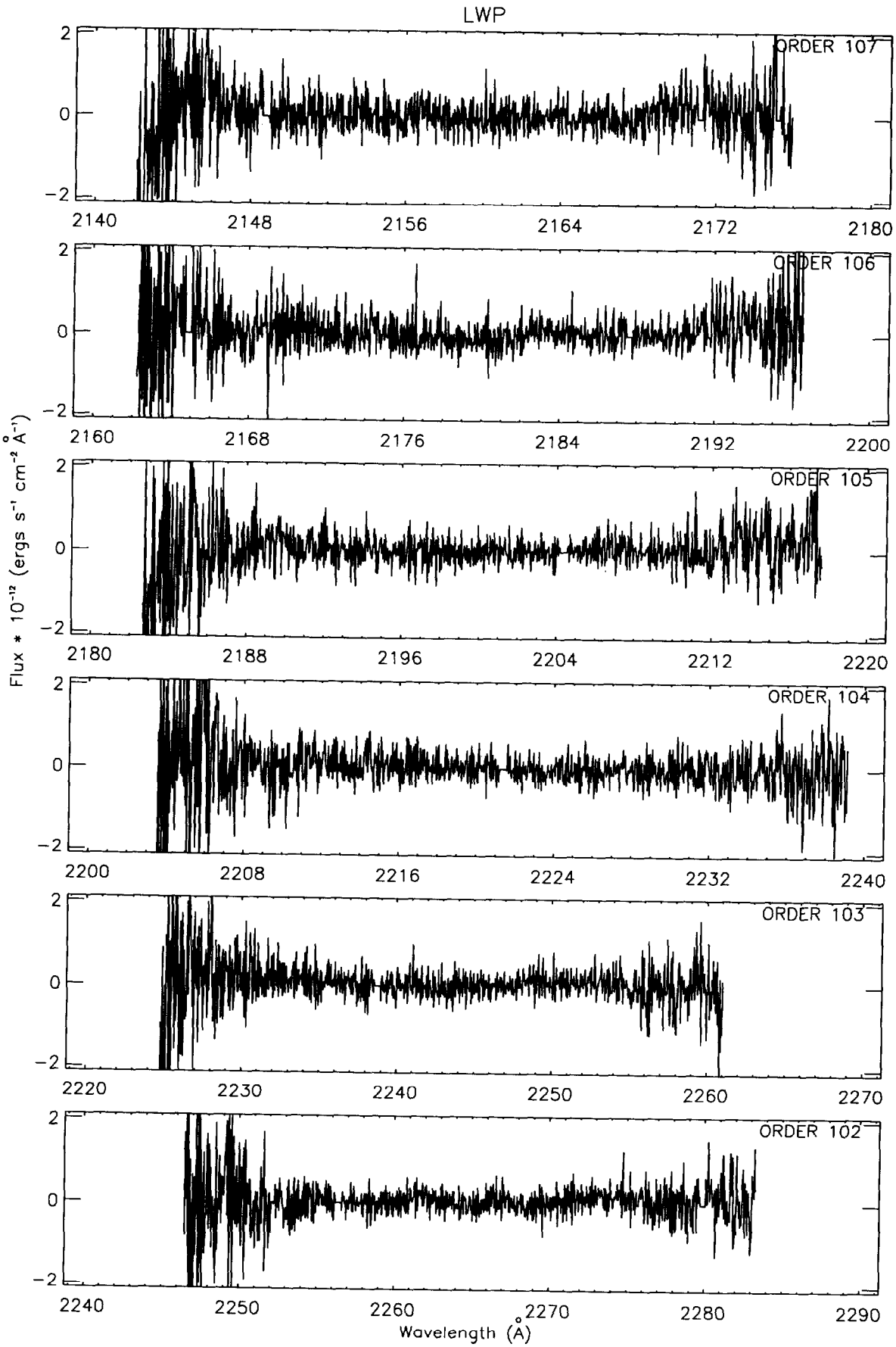

SWP
ORDER 77
ORDER 76
ORDER 75
ORDER 74
ORDER 73
ORDER 72
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


SWP
ORDER 71
ORDER 70
ORDER 69
ORDER 68
ORDER 67
ORDER 66
Flux * 10^-12 (ergs s^-1 cm^-2 Å^-1)
Wavelength (Å)


LWP
ORDER 125
ORDER 124
ORDER 123
ORDER 122
ORDER 121
ORDER 120
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWP
ORDER 119
ORDER 118
ORDER 117
ORDER 116
ORDER 115
ORDER 114
5
0
−5
1925
1931
1937
1943
1949
1955
1945
1951
1957
1963
1969
1975
1960
1966
1972
1978
1984
1990
1975
1982
1989
1996
2003
2010
1995
2001
2007
2013
2019
2025
2010
2018
2026
2034
2042
2050
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWP
ORDER 113
ORDER 112
ORDER 111
ORDER 110
ORDER 109
ORDER 108
2
0
−2
2020
2028
2036
2044
2052
2060
2040
2048
2056
2064
2072
2080
2060
2068
2076
2084
2092
2100
2080
2088
2096
2104
2112
2120
2100
2108
2116
2124
2132
2140
2120
2128
2136
2144
2152
2160
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWP
ORDER 107
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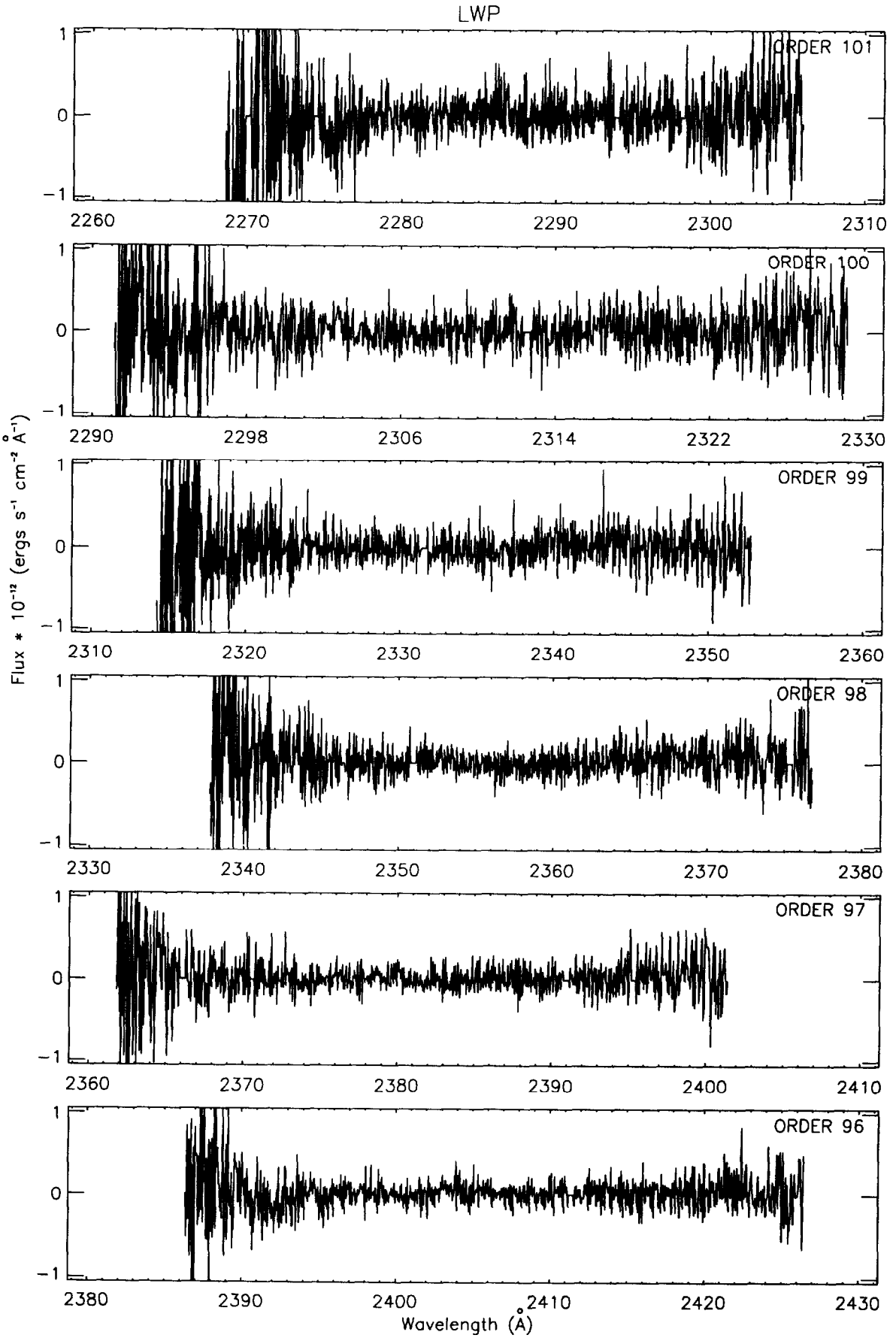
ORDER 105
ORDER 104
ORDER 103
ORDER 102
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWP
ORDER 101
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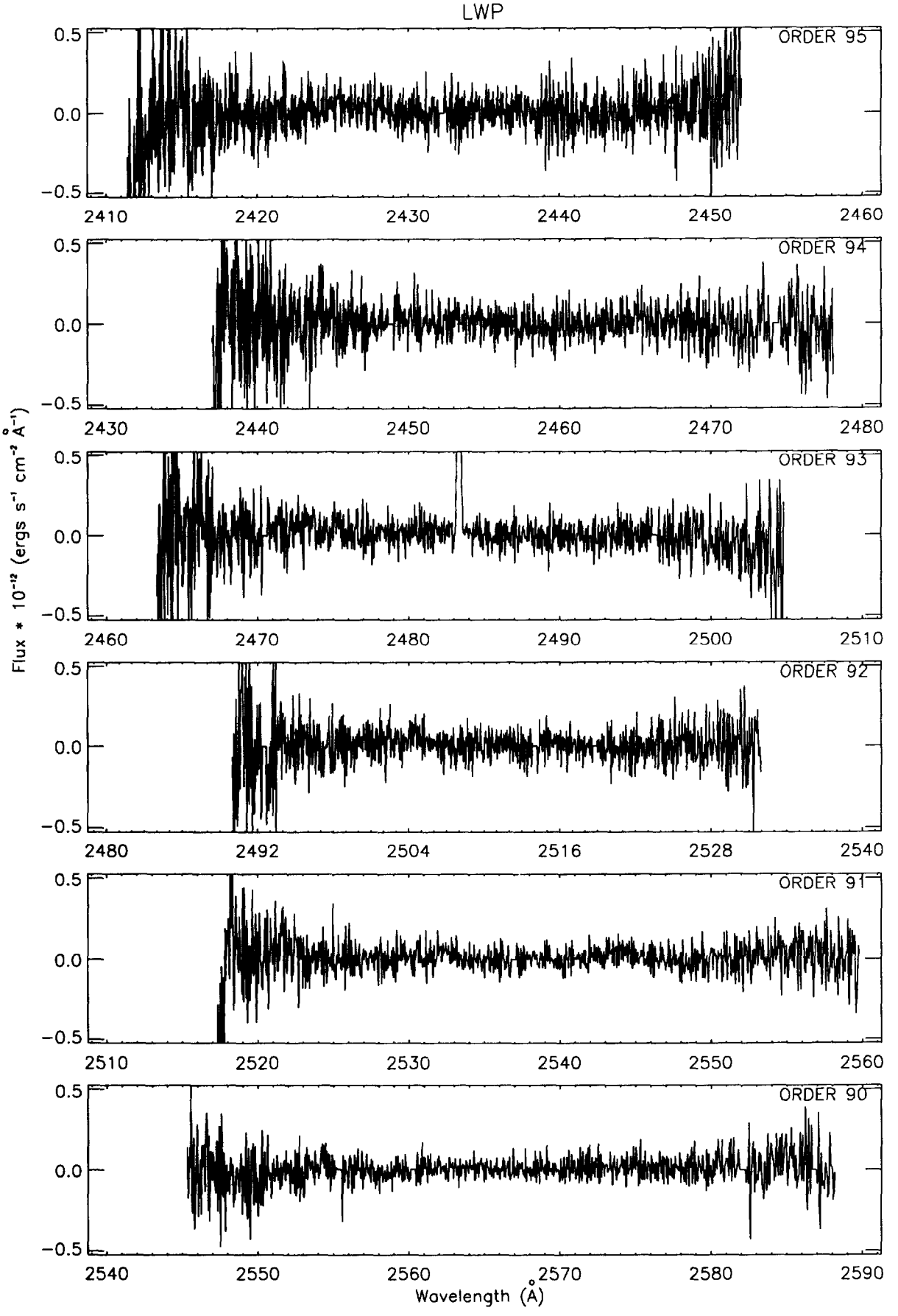
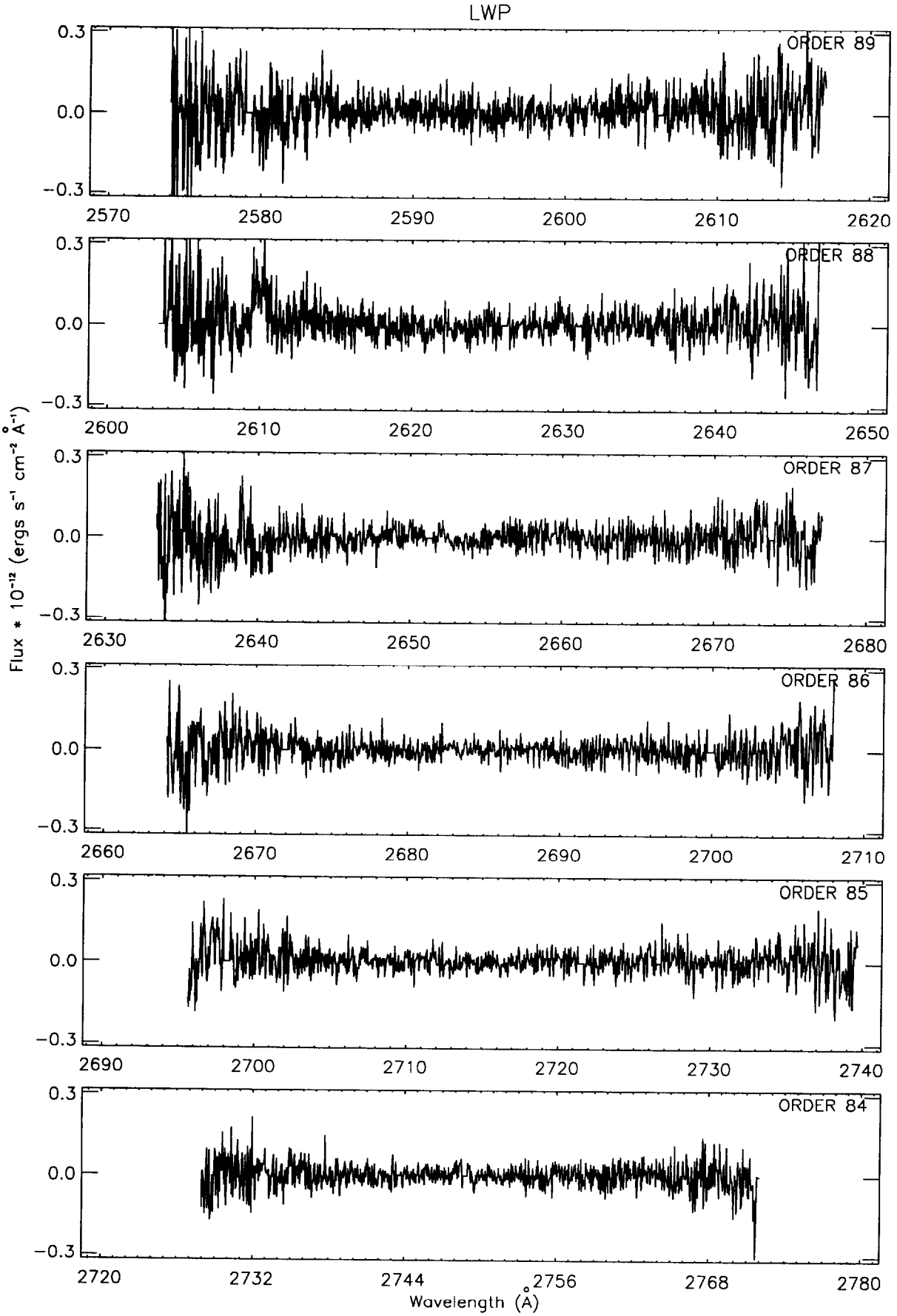
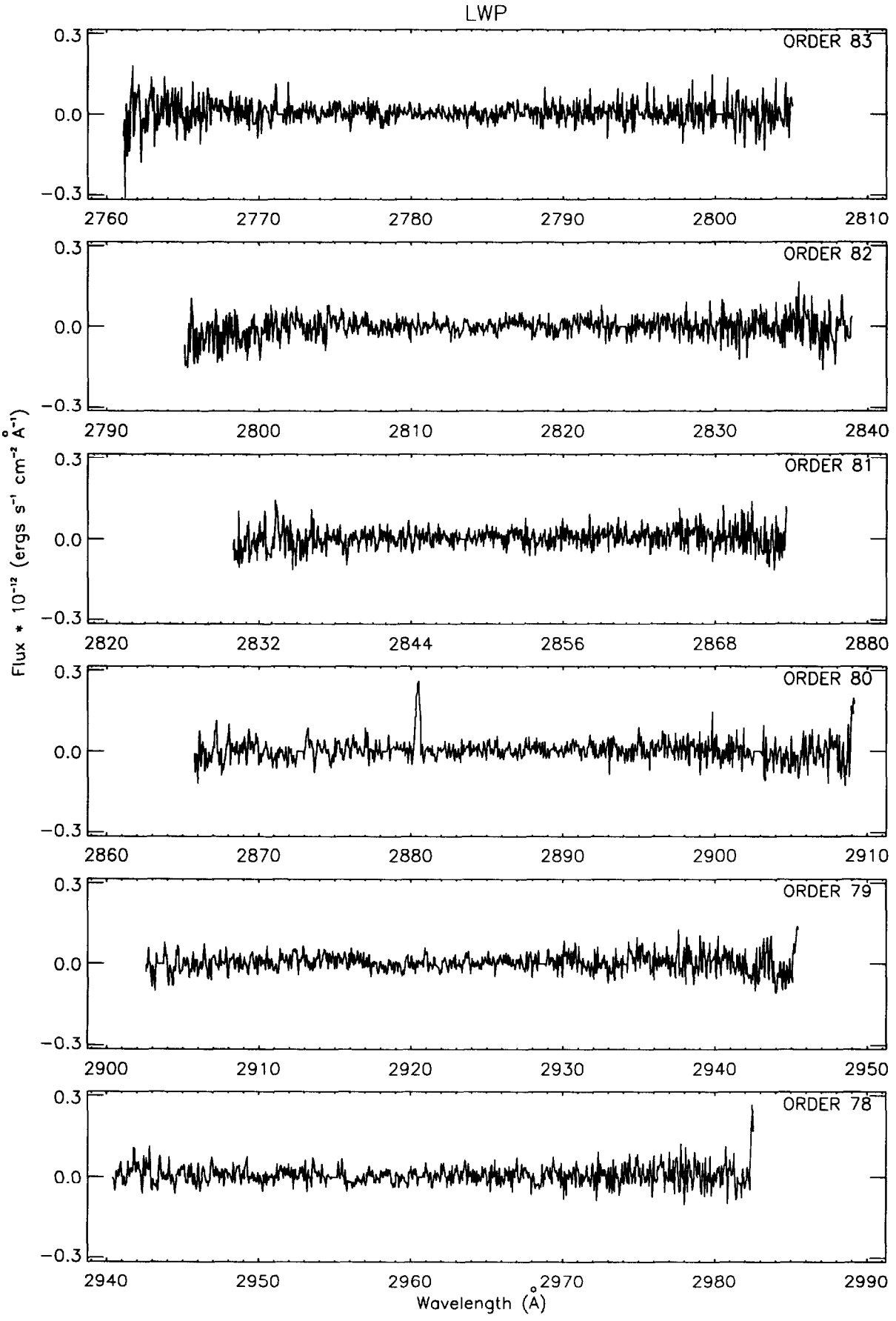
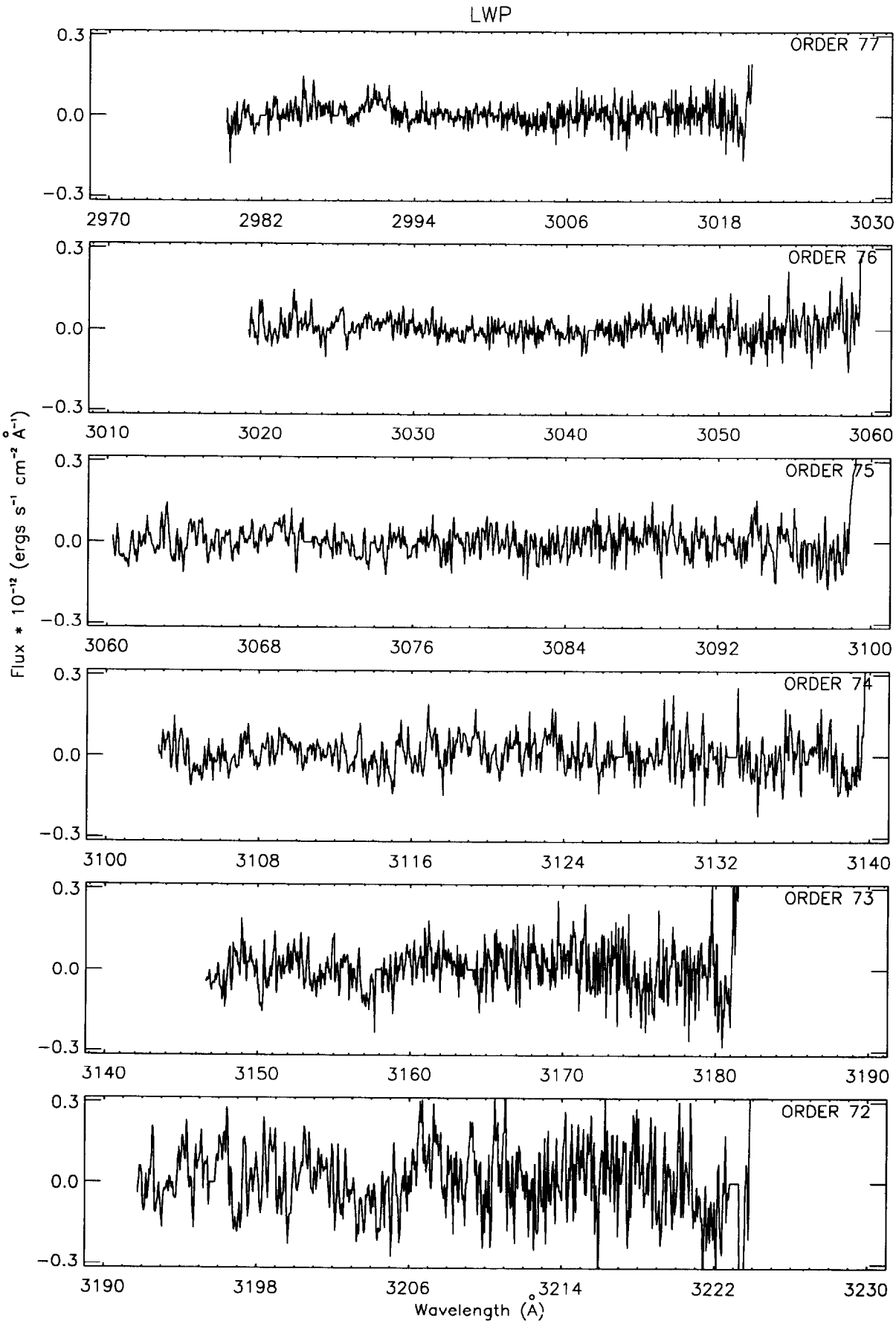
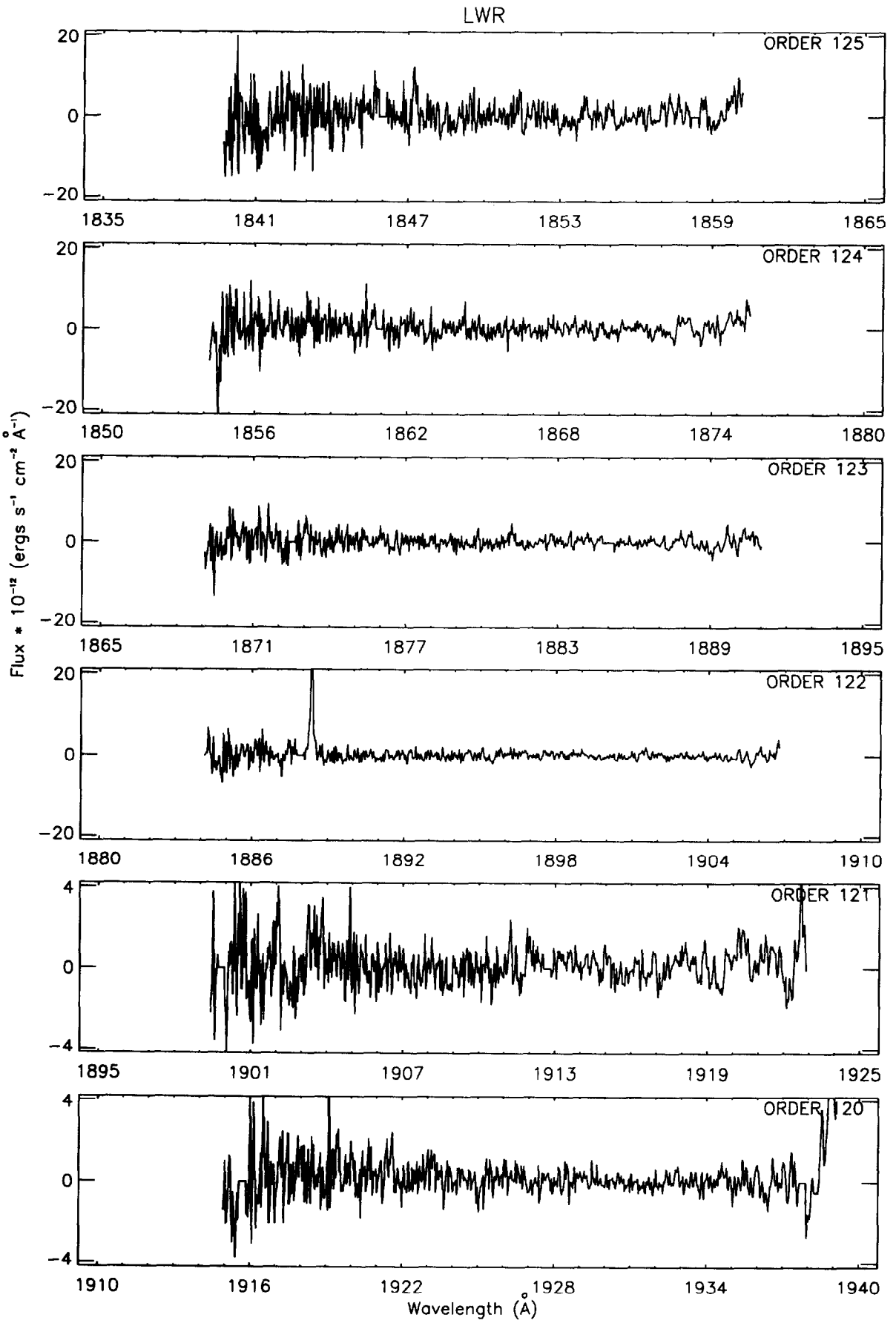
ORDER 99
ORDER 98
ORDER 97
ORDER 96
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)

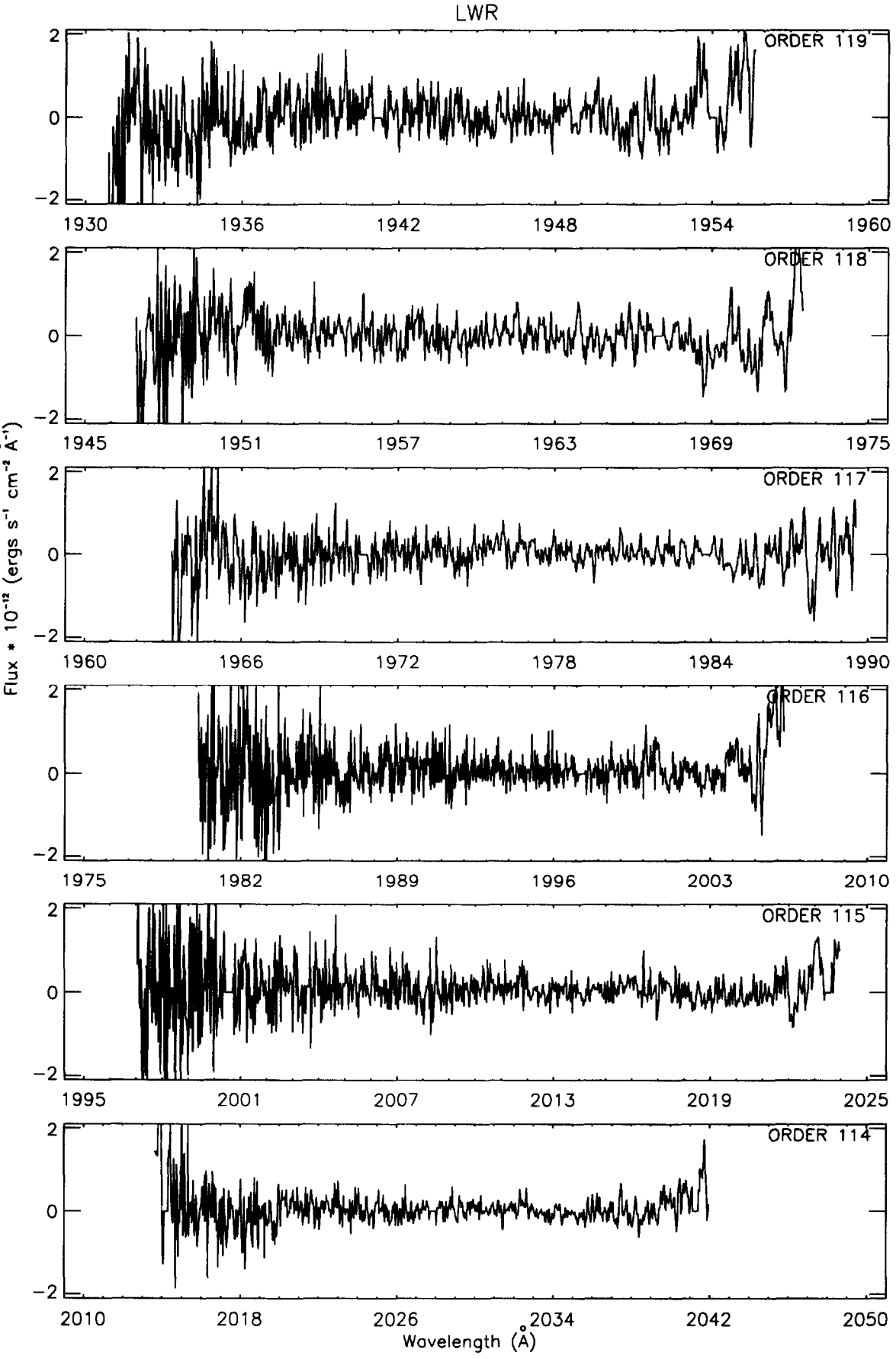

LWP
ORDER 95
ORDER 94
ORDER 93
ORDER 92
ORDER 91
ORDER 90
0.5
0.0
−0.5
2410
2420
2430
2440
2450
2460
2470
2480
2490
2500
2510
2492
2504
2516
2528
2520
2530
2540
2550
2560
2570
2580
2590
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)

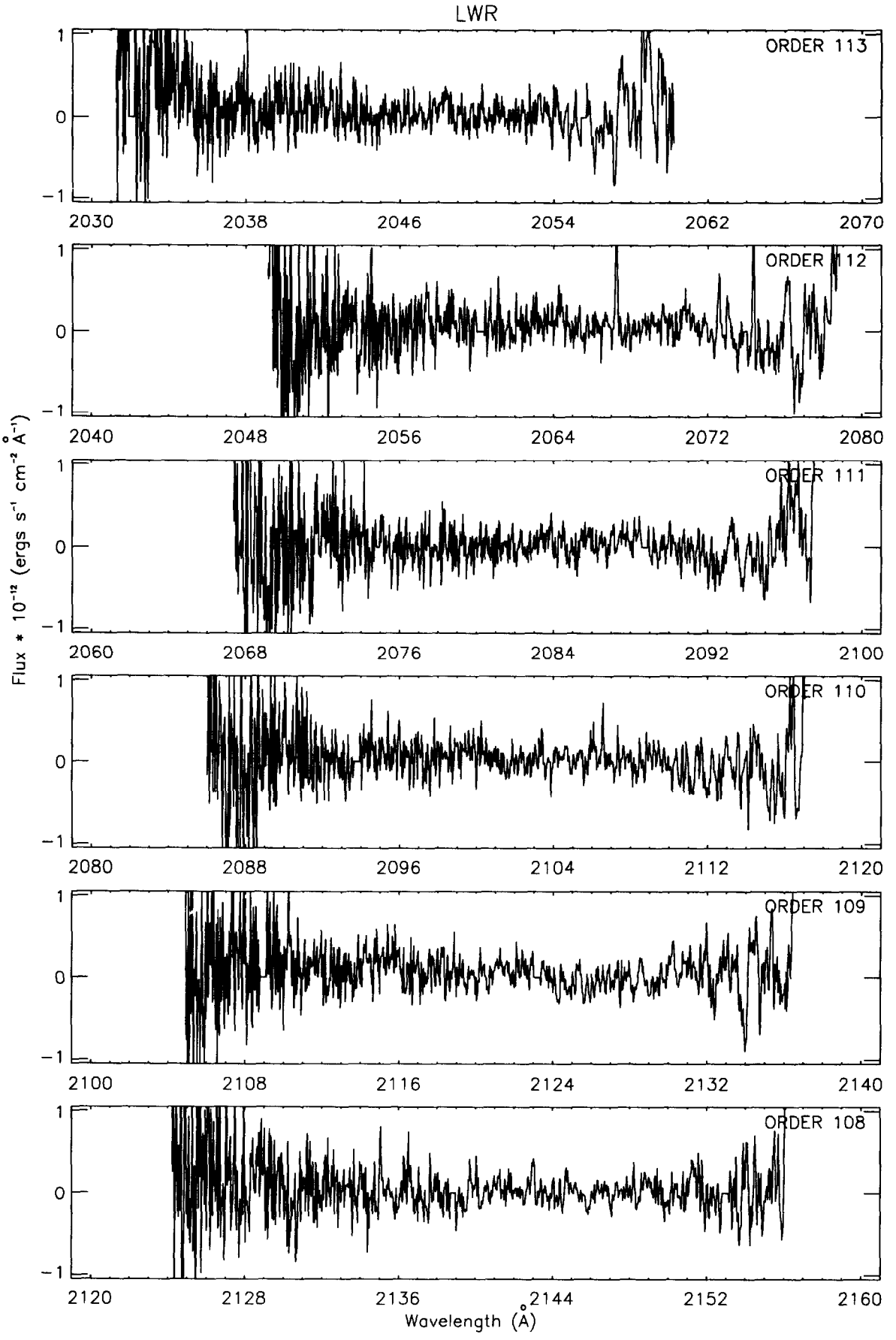

LWP
ORDER 89
ORDER 88
ORDER 87
ORDER 86
ORDER 85
ORDER 84
0.3
0.0
−0.3
2570
2580
2590
2600
2610
2620
2630
2640
2650
2660
2670
2680
2690
2700
2710
2720
2730
2740
2744
2756
2768
2780
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)

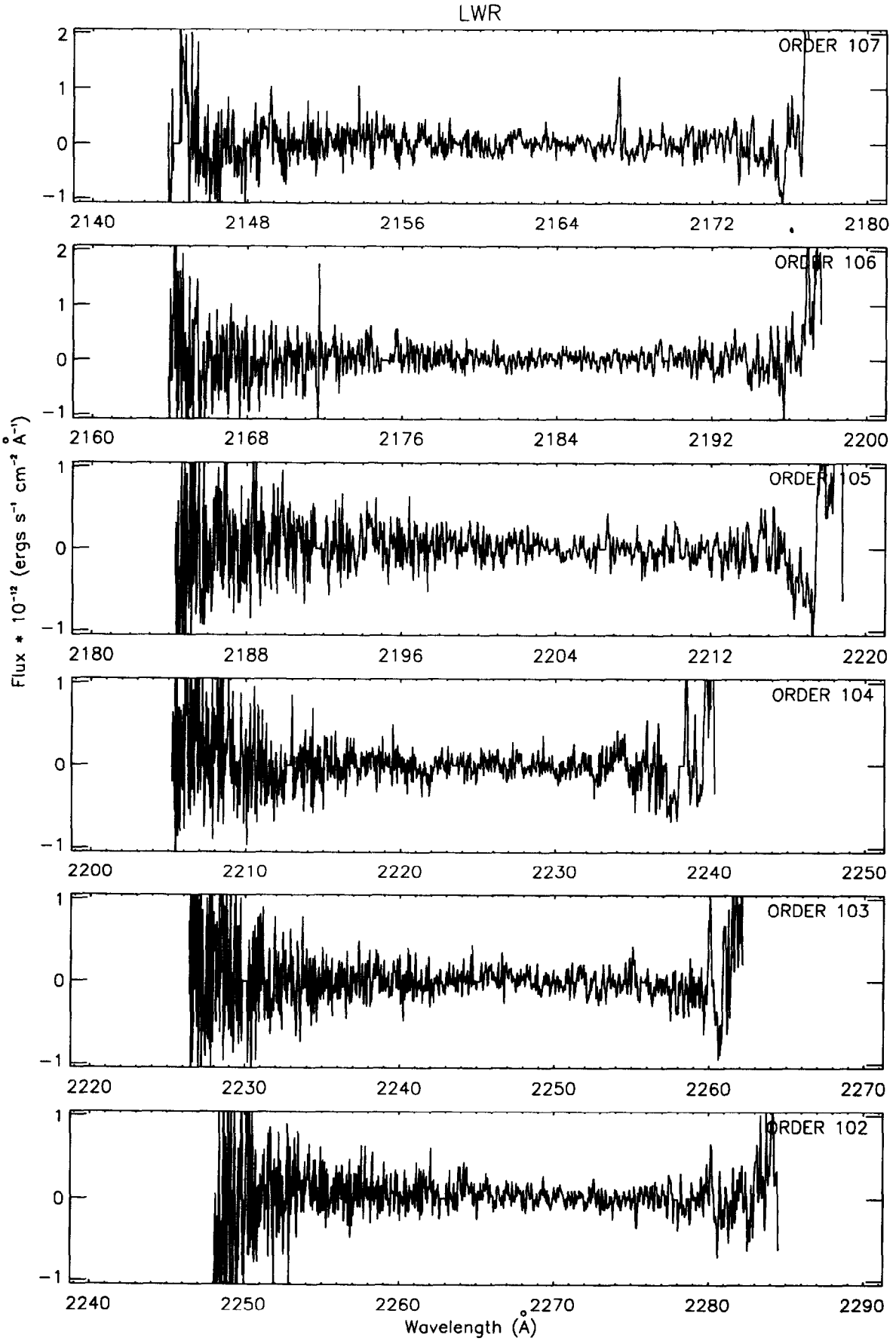

LWP
ORDER 83
ORDER 82
ORDER 81
ORDER 80
ORDER 79
ORDER 78
0.3
0.0
−0.3
2760
2770
2780
2790
2800
2810
2840
2820
2832
2844
2856
2868
2880
2860
2870
2890
2900
2910
2920
2930
2940
2950
2960
2970
2980
2990
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWP
ORDER 77
ORDER 76
ORDER 75
ORDER 74
ORDER 73
ORDER 72
0.3
0.0
−0.3
2970
2982
2994
3006
3018
3030
3010
3020
3030
3040
3050
3060
3060
3068
3076
3084
3092
3100
3100
3108
3116
3124
3132
3140
3140
3150
3160
3170
3180
3190
3190
3198
3206
3214
3222
3230
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 125
ORDER 124
ORDER 123
ORDER 122
ORDER 121
ORDER 120
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 119
ORDER 118
ORDER 117
ORDER 116
ORDER 115
ORDER 114
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 113
ORDER 112
ORDER 111
ORDER 110
ORDER 109
ORDER 108
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 107
ORDER 106
ORDER 105
ORDER 104
ORDER 103
ORDER 102
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)
2140
2148
2156
2164
2172
2180
2160
2168
2176
2184
2192
2200
2180
2188
2196
2204
2212
2220
2200
2210
2220
2230
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2240
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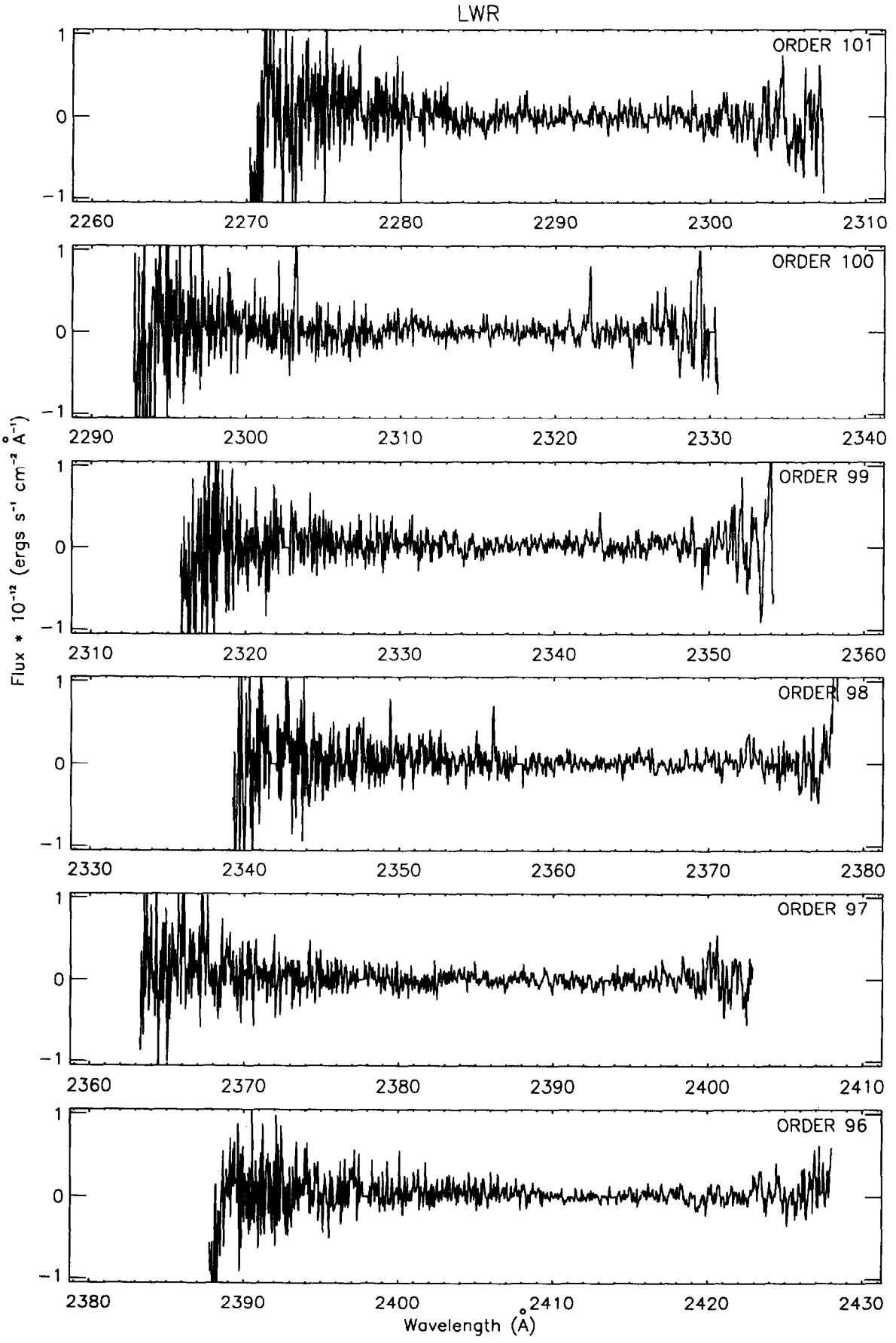
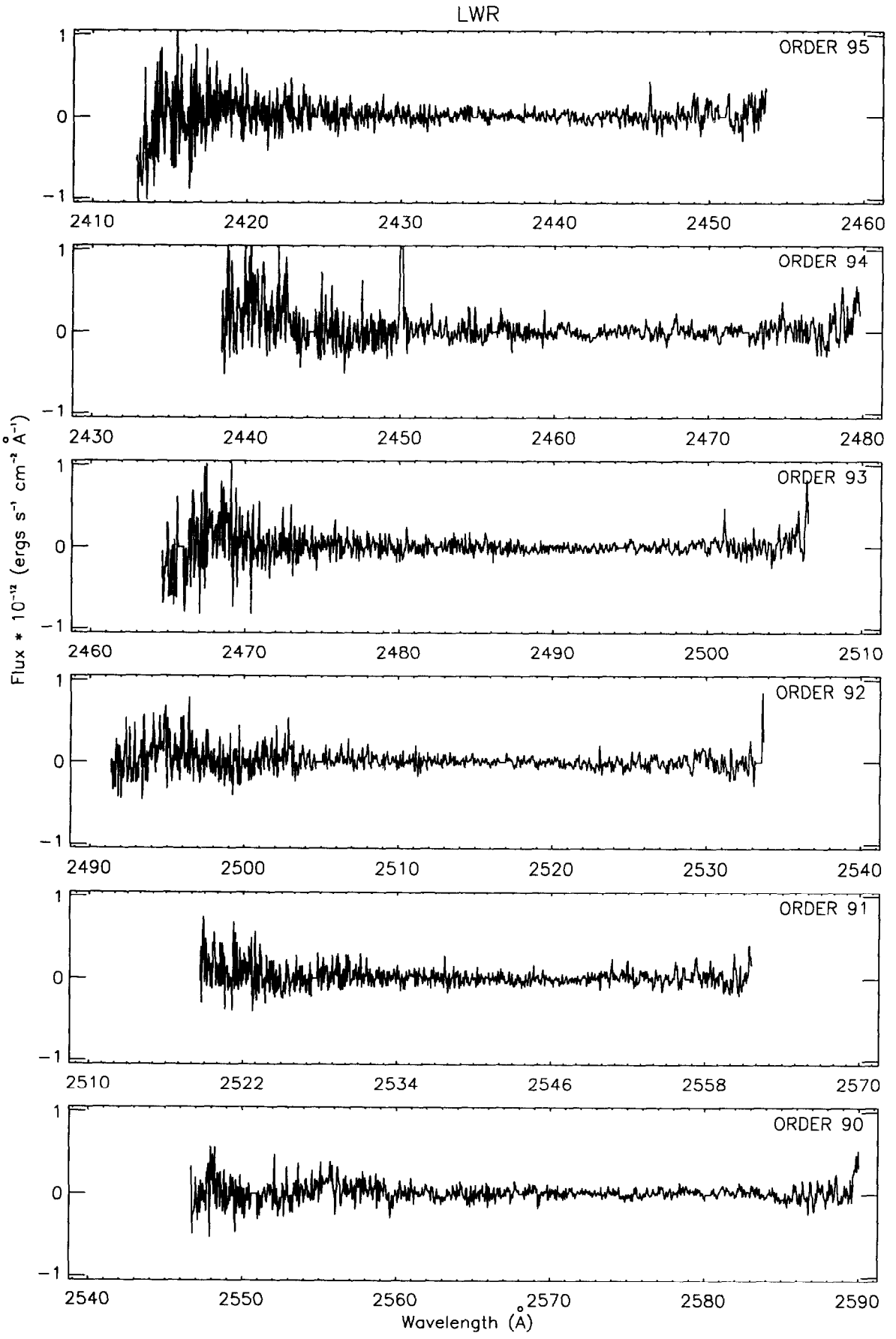
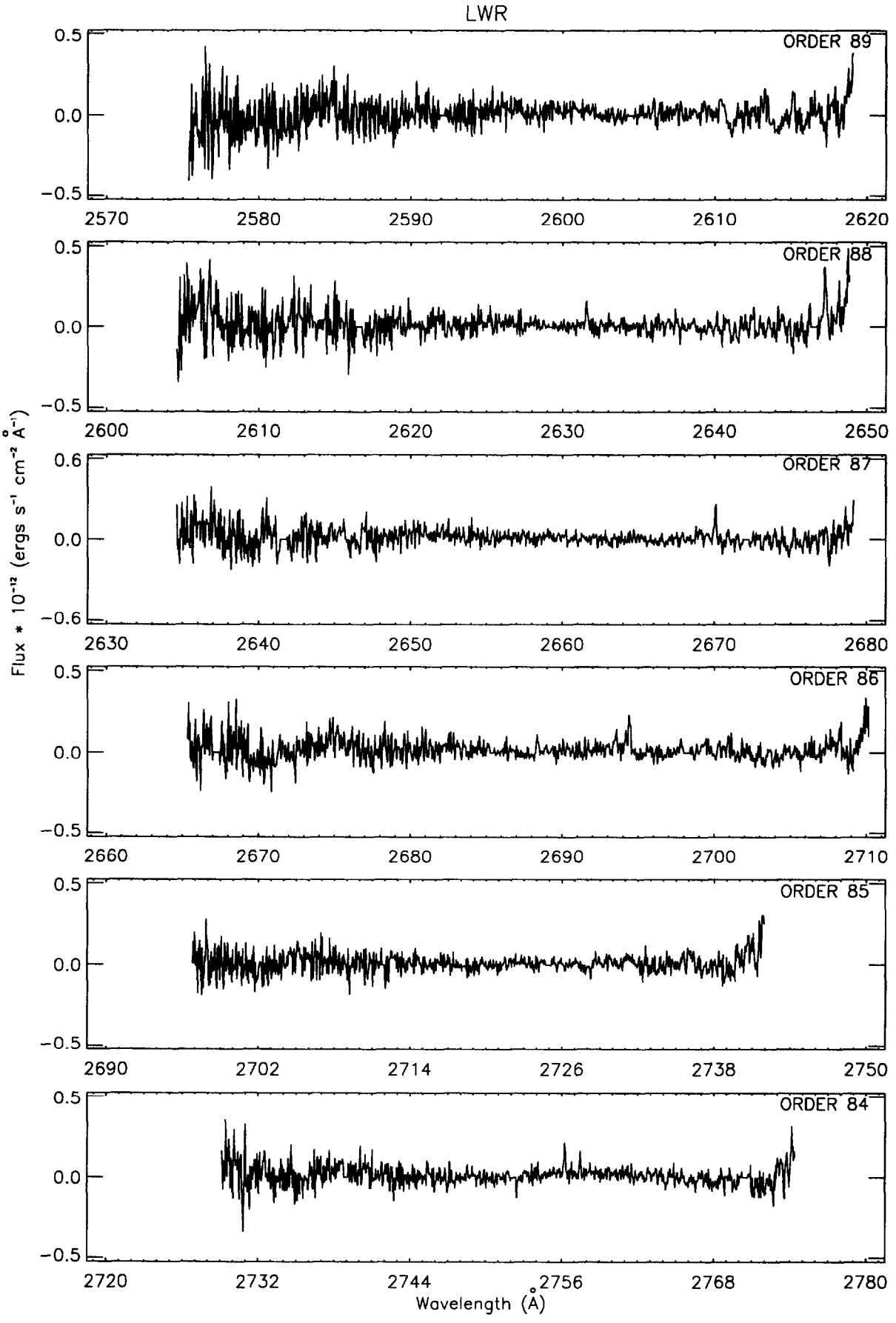
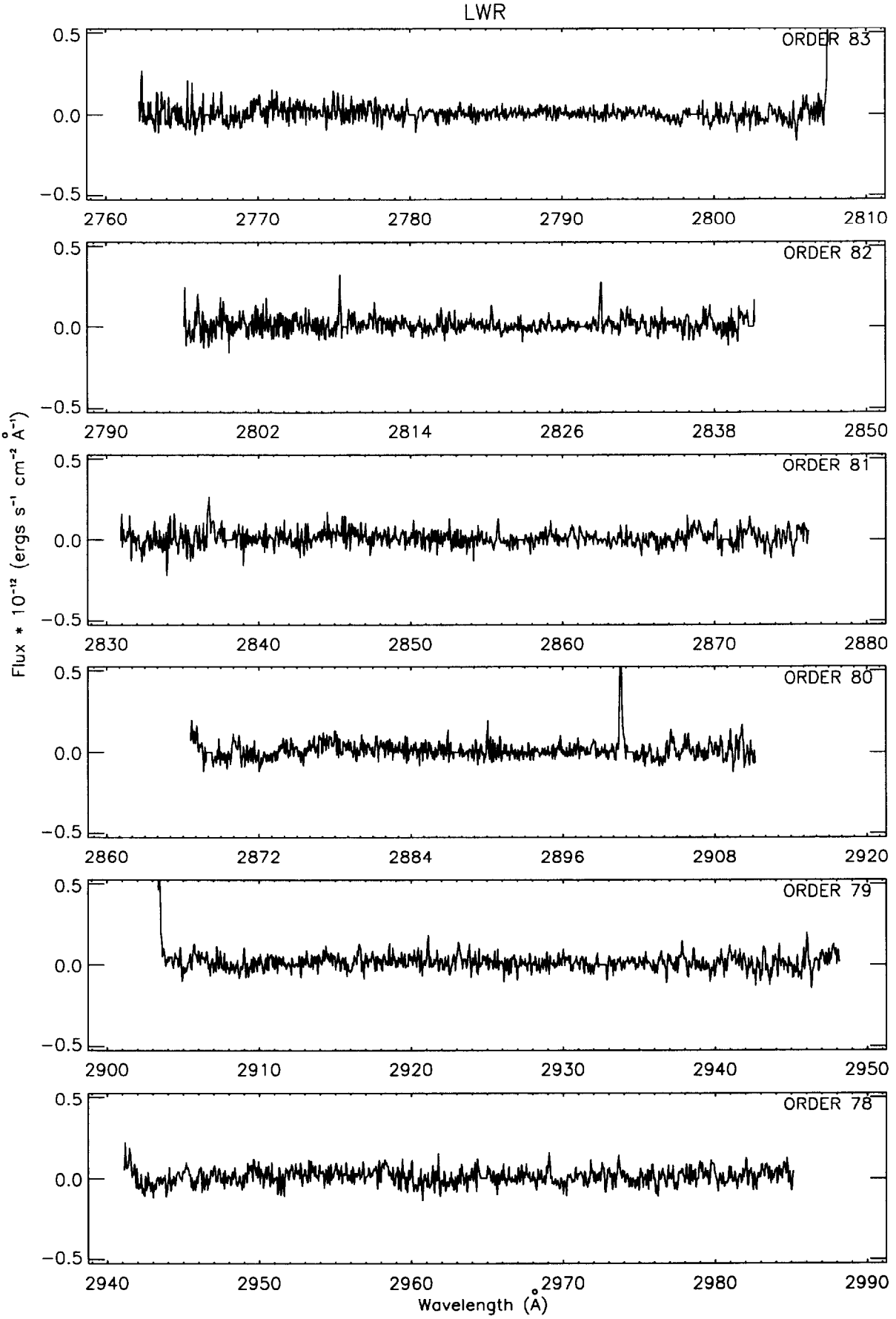
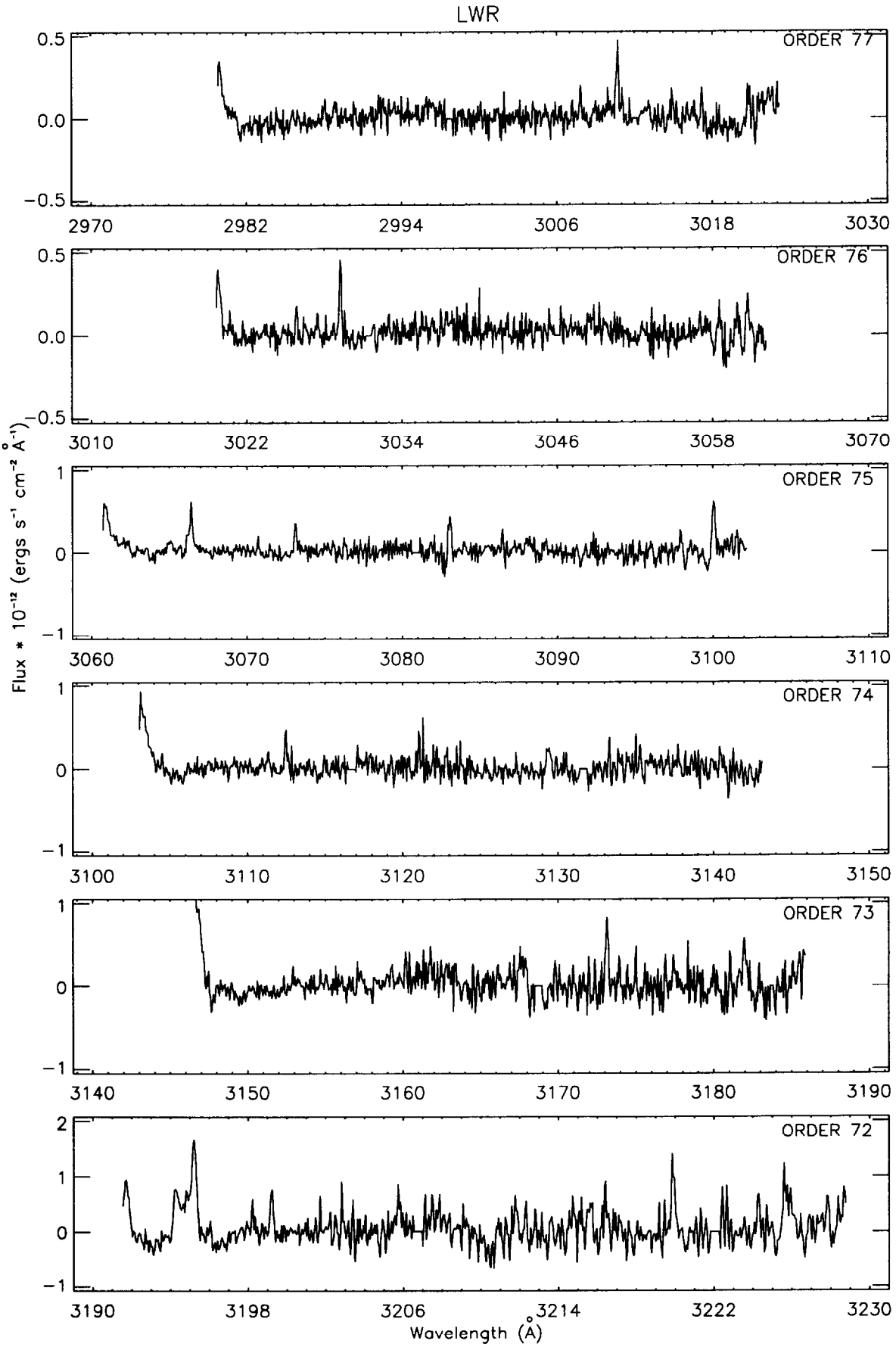
2260
2270
2280
2290


LWR
ORDER 101
ORDER 100
ORDER 99
ORDER 98
ORDER 97
ORDER 96
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 95
ORDER 94
ORDER 93
ORDER 92
ORDER 91
ORDER 90
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 89
ORDER 88
ORDER 87
ORDER 86
ORDER 85
ORDER 84
0.5
0.0
−0.5
0.6
−0.6
2570
2580
2590
2600
2610
2620
2630
2640
2650
2660
2670
2680
2690
2700
2710
2702
2714
2726
2738
2750
2720
2732
2744
2756
2768
2780
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 83
ORDER 82
ORDER 81
ORDER 80
ORDER 79
ORDER 78
0.5
0.0
−0.5
2760
2770
2780
2790
2800
2810
2790
2802
2814
2826
2838
2850
2830
2840
2850
2860
2870
2880
2860
2872
2884
2896
2908
2920
2900
2910
2920
2930
2940
2950
2940
2950
2960
2970
2980
2990
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)


LWR
ORDER 77
ORDER 76
ORDER 75
ORDER 74
ORDER 73
ORDER 72
Flux * 10⁻¹² (ergs s⁻¹ cm⁻² Å⁻¹)
Wavelength (Å)