

作业三·长期水位资料的调和与分析

数据来源:

站点信息:

sta. XM

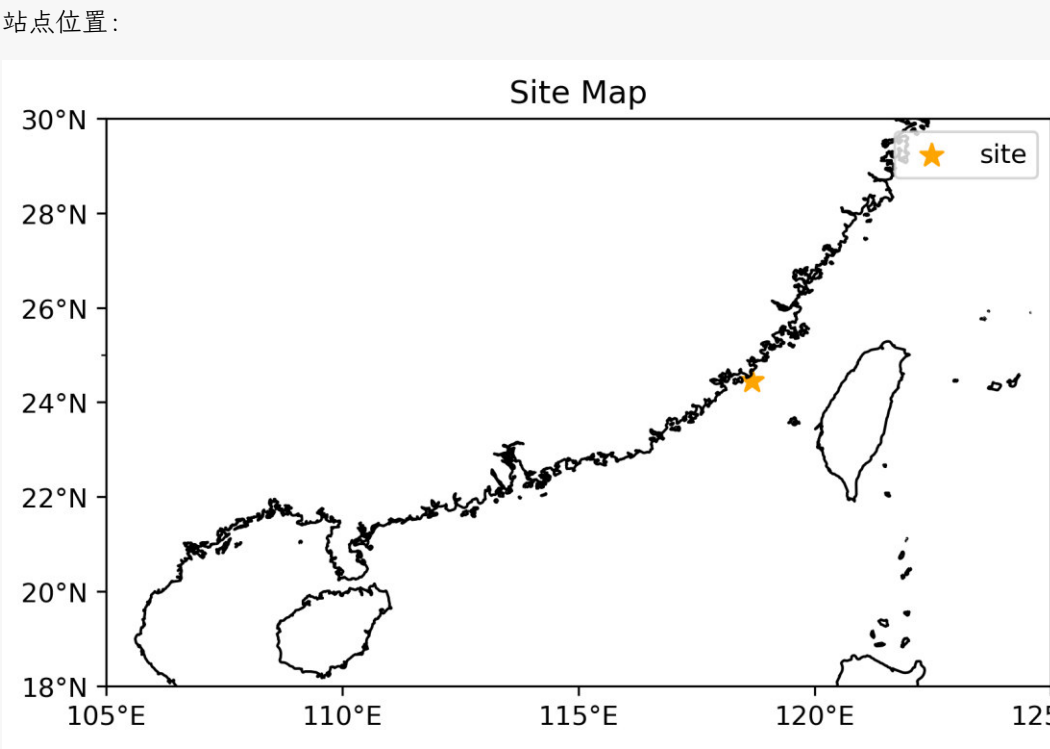
Lat:24deg. 27min. N

Lon:118deg. 40min. E

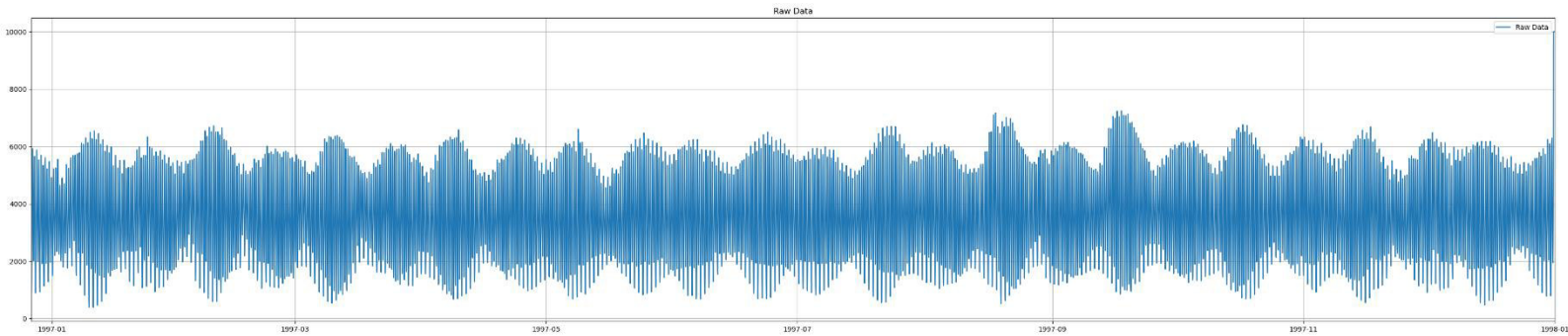
units: mm

time: 1996-12-27~1997-12-31 (GMT)

missvaule: 9999



原始数据:



过程:

1. 异常值处理

a. 统计特性检验

| | 异常值 | 异常数组索引位置 |
|---------------------|------|----------|
| 异常时间 | | |
| 1997-12-31 17:00:00 | 9999 | 8872 |
| 1997-12-31 18:00:00 | 9999 | 8873 |
| 1997-12-31 19:00:00 | 9999 | 8874 |
| 1997-12-31 20:00:00 | 9999 | 8875 |
| 1997-12-31 21:00:00 | 9999 | 8876 |
| 1997-12-31 22:00:00 | 9999 | 8877 |
| 1997-12-31 23:00:00 | 9999 | 8878 |
| 1998-01-01 00:00:00 | 9999 | 8879 |

由于此异常点均在末尾，于是直接剔除。

b. 连续性检验

异常数组索引位置: []

异常值: []

无异常

2. 计算

a. 计算各分潮的角速率 σ 和初相位角 V_0

| | σ | V_0 | f_0 | u_0 |
|-----|-----------|---------------|----------|-----------|
| 分潮 | | | | |
| M2 | 28.984104 | -29150.397235 | 1.037758 | -0.239483 |
| O1 | 13.943036 | -30088.339718 | 0.807322 | 1.569357 |
| S2 | 30.000000 | 960.000000 | 1.000000 | 0.000000 |
| K1 | 15.041069 | 937.942483 | 0.882576 | -1.165851 |
| P1 | 14.958931 | 22.057517 | 1.000000 | 0.000000 |
| N2 | 28.439730 | -40362.184769 | 1.037758 | -0.239483 |
| Q1 | 13.398661 | -41300.127252 | 0.807322 | 1.569357 |
| K2 | 30.082137 | 1875.884966 | 0.749106 | -2.149690 |
| M4 | 57.968208 | -58300.794470 | 1.076942 | -0.478966 |
| MS4 | 58.984104 | -28190.397235 | 1.076942 | -0.239483 |

b. 求解法方程&计算调和常数

| | a | b | R | θ | H | g |
|-----|--------------|-------------|-------------|------------|-------------|------------|
| 分潮 | | | | | | |
| M2 | -1460.102843 | 1239.338306 | 1915.165724 | 82.648415 | 1845.483605 | 8.659484 |
| O1 | -53.780013 | -216.599202 | 223.175949 | -59.769138 | 276.439846 | 64.557064 |
| S2 | 368.429984 | -377.902054 | 527.778946 | -63.498182 | 527.778946 | 239.201911 |
| K1 | 197.306115 | 228.400426 | 301.821898 | 49.177560 | 341.978206 | 307.634942 |
| P1 | 51.051973 | 97.105078 | 109.707339 | 62.267323 | 109.707339 | 293.144287 |
| N2 | -349.550854 | 64.514394 | 355.454506 | 80.799918 | 342.521514 | 317.393238 |
| Q1 | 13.719769 | -43.172999 | 45.300551 | -72.370479 | 56.112128 | 10.179002 |
| K2 | -51.515602 | 102.913995 | 115.087565 | 38.694182 | 153.633137 | 72.628583 |
| M4 | 34.167625 | -87.967445 | 94.370006 | -68.773225 | 87.627747 | 17.526245 |
| MS4 | -21.067135 | 53.356617 | 57.365083 | 18.557827 | 53.266638 | 248.168533 |

得到回报数据和实际数据的对比：



计算 1997 年 8 月该站的高、低潮的潮时和潮高；计算余水位、平均潮差；计算该站的潮汐类型：

| | 高潮时间 | 高潮潮高 | 低潮时间 | 低潮潮高 | 潮差 |
|-----|---------------------|-------------|---------------------|-------------|-------------|
| 0 | 1996-12-27 03:00:00 | 5630.506733 | 1996-12-27 01:00:00 | 5114.735643 | 515.771091 |
| 1 | 1996-12-27 16:00:00 | 5006.155672 | 1996-12-27 09:00:00 | 1497.542813 | 3508.612859 |
| 2 | 1996-12-28 04:00:00 | 5813.744809 | 1996-12-27 21:00:00 | 2212.391323 | 3601.353487 |
| 3 | 1996-12-28 17:00:00 | 5268.480723 | 1996-12-28 10:00:00 | 1355.662646 | 3912.818077 |
| 4 | 1996-12-29 05:00:00 | 5954.533195 | 1996-12-28 22:00:00 | 2024.066934 | 3930.466261 |
| ... | ... | ... | ... | ... | ... |
| 56 | 1997-01-25 02:00:00 | 5373.983273 | 1997-01-24 19:00:00 | 2352.455919 | 3021.527354 |
| 57 | 1997-01-25 15:00:00 | 4964.152477 | 1997-01-25 08:00:00 | 1781.739304 | 3182.413173 |
| 58 | 1997-01-26 03:00:00 | 5516.068188 | 1997-01-25 21:00:00 | 2231.387729 | 3284.680459 |
| 59 | 1997-01-26 16:00:00 | 5276.983075 | 1997-01-26 09:00:00 | 1684.255137 | 3592.727938 |
| 60 | 1997-01-27 00:00:00 | 2948.858147 | 1997-01-26 22:00:00 | 2017.306908 | 931.551239 |

详细数据参见‘潮差.csv’

潮汐类型：正规半日潮