Data obtained from the statistical program stata:

Yearly analysis

Confidence interval

```
ci  ch4
```

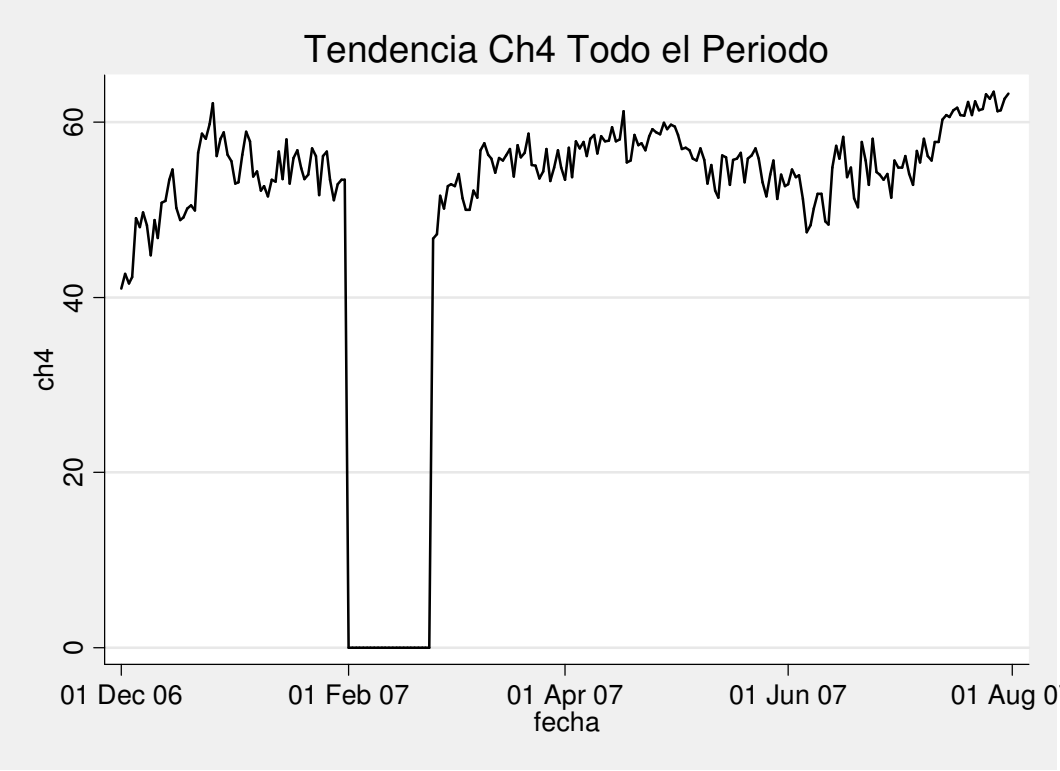
```
    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |        243    49.80329    1.063871        47.70766    51.89892
```

```
sum ch4,d
```

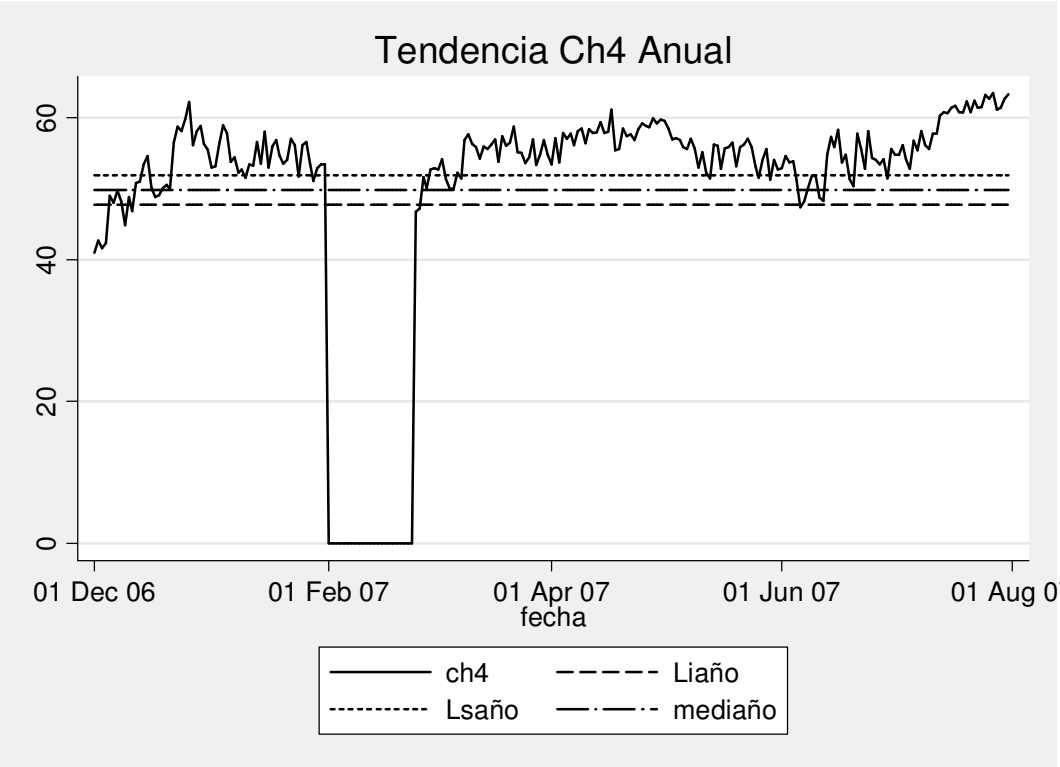
```
                            ch4
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%         41.6              0       Obs                 243
25%         51.4              0       Sum of Wgt.         243

50%         54.8                      Mean           49.80329
                        Largest       Std. Dev.      16.58412
75%         57.3           62.7
90%         59.5           63.2       Variance       275.0329
95%         61.4           63.3       Skewness      -2.508429
99%         63.2           63.5       Kurtosis       7.805279
```

Model AR(1)

```
prais ch4 fecha, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.9481
Iteration 2:  rho = 0.9481
Iteration 3:  rho = 0.9481

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =     243
-------------+------------------------------           F(  1,   241) =    5.13
       Model |  129.160118     1  129.160118           Prob > F      =  0.0245
    Residual |  6072.33457   241   25.196409           R-squared     =  0.0208
-------------+------------------------------           Adj R-squared =  0.0168
       Total |  6201.49469   242  25.6260111           Root MSE      =  5.0196

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .0807095   .0717521     1.12   0.262    -.0606319    .2220508
       _cons |  -1342.693    1238.24    -1.08   0.279    -3781.847    1096.461
-------------+----------------------------------------------------------------
         rho |   .9480803
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    0.104121
Durbin-Watson statistic (transformed) 2.058256
```



Trend of all the period



Monthly analysis

```
by mes:sum  ch4

-> mes = 1

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        31    54.45161    2.068634       51.1       58.9

-------------------------------------------------------------------------------
-> mes = 2

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        28    8.867857    19.39521          0       52.7

-------------------------------------------------------------------------------
-> mes = 3

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        31    54.74194    2.224226         50       58.7

-------------------------------------------------------------------------------
-> mes = 4

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        30    57.71333    1.694562       53.4       61.2

-------------------------------------------------------------------------------
-> mes = 5

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        31    55.08387    2.103821       51.2       59.5

-------------------------------------------------------------------------------
-> mes = 6

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        30    53.19667    2.948229       47.4       58.3

-------------------------------------------------------------------------------
-> mes = 7

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        31    59.43871    3.169194       52.8       63.5

-------------------------------------------------------------------------------
-> mes = 12

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ch4 |        31    51.33548    5.690492         41       62.2
```

Confidence intervals

by mes:ci ch4

```
-------------------------------------------------------------------------------
-> mes = 1

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         31    54.45161    .3715376        53.69283    55.21039

-------------------------------------------------------------------------------
-> mes = 2

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         28    8.867857     3.66535         1.34718    16.38853

-------------------------------------------------------------------------------
-> mes = 3

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         31    54.74194    .3994828        53.92608    55.55779

-------------------------------------------------------------------------------
-> mes = 4

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         30    57.71333    .3093833        57.08057    58.34609

-------------------------------------------------------------------------------
-> mes = 5

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         31    55.08387    .3778575        54.31218    55.85556

-------------------------------------------------------------------------------
-> mes = 6

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         30    53.19667    .5382705        52.09578    54.29755

-------------------------------------------------------------------------------
-> mes = 7

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         31    59.43871     .569204        58.27624    60.60118

-------------------------------------------------------------------------------
-> mes = 12

    Variable |        Obs        Mean    Std. Err.       [95% Conf. Interval]
-------------+---------------------------------------------------------------
         ch4 |         31    51.33548    1.022043        49.24819    53.42277
```

Model AR(1)

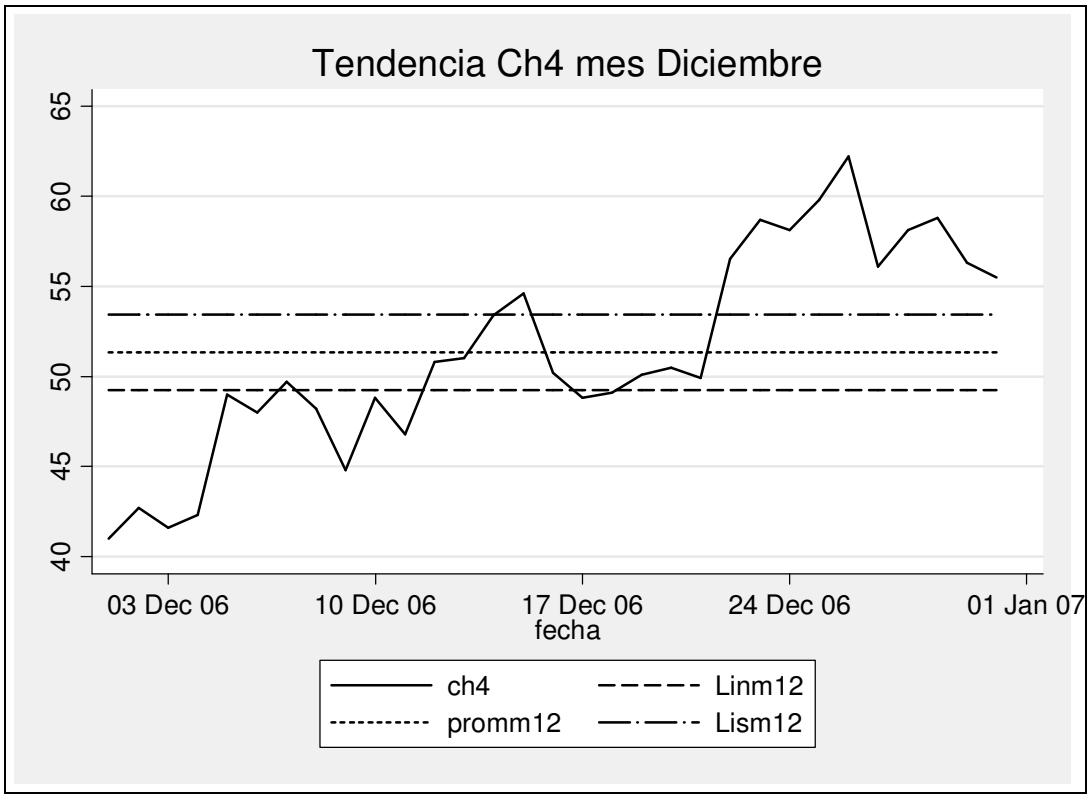
```
. prais ch4 fecha if mes==12, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.4938
Iteration 2:  rho = 0.4971
Iteration 3:  rho = 0.4972
Iteration 4:  rho = 0.4972
Iteration 5:  rho = 0.4972

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =   34.70
       Model |  214.997801     1  214.997801           Prob > F      =  0.0000
    Residual |  179.655822    29  6.19502833           R-squared     =  0.5448
-------------+------------------------------           Adj R-squared =  0.5291
       Total |  394.653623    30  13.1551208           Root MSE      =   2.489

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .5347176   .0906252     5.90   0.000     .3493682    .7200669
       _cons |  -9119.791   1554.313    -5.87   0.000    -12298.72   -5940.863
-------------+----------------------------------------------------------------
         rho |     .49723
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    0.991738
Durbin-Watson statistic (transformed) 1.889927



prais ch4 fecha if mes==1, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.2133
Iteration 2:  rho = 0.2143
Iteration 3:  rho = 0.2143
Iteration 4:  rho = 0.2143

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =   18.53
       Model |   76.750361     1   76.750361           Prob > F      =  0.0002
    Residual |  120.087549    29  4.14094995           R-squared     =  0.3899
-------------+------------------------------           Adj R-squared =  0.3689
       Total |   196.83791    30  6.56126366           Root MSE      =  2.0349

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |  -.0287481   .0506679    -0.57   0.575    -.1323755    .0748794
       _cons |   548.3793   870.5757     0.63   0.534    -1232.148    2328.907
-------------+----------------------------------------------------------------
         rho |    .214345
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.542576
Durbin-Watson statistic (transformed) 1.941821
```

```
prais ch4 fecha if mes==2, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.8295
Iteration 2:  rho = 0.8358
Iteration 3:  rho = 0.8367
Iteration 4:  rho = 0.8369
Iteration 5:  rho = 0.8369
Iteration 6:  rho = 0.8369
Iteration 7:  rho = 0.8369

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      28
-------------+------------------------------           F(  1,    26) =    4.24
       Model |   322.76339     1   322.76339           Prob > F      =  0.0496
    Residual |   1978.5445    26  76.0978655           R-squared     =  0.1403
-------------+------------------------------           Adj R-squared =  0.1072
       Total |  2301.30789    27  85.2336257           Root MSE      =  8.7234

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   1.798865   .7932591     2.27   0.032     .1682975    3.429432
       _cons |  -30947.61   13653.18    -2.27   0.032    -59012.13   -2883.089
-------------+----------------------------------------------------------------
         rho |   .8369231
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    0.373738
Durbin-Watson statistic (transformed) 1.899471



prais ch4 fecha if mes==3, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.4393
Iteration 2:  rho = 0.4404
Iteration 3:  rho = 0.4404
Iteration 4:  rho = 0.4404

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =   86.49
       Model |  280.611068     1  280.611068           Prob > F      =  0.0000
    Residual |  94.0857931    29  3.24433769           R-squared     =  0.7489
-------------+------------------------------           Adj R-squared =  0.7402
       Total |  374.696861    30  12.4898954           Root MSE      =  1.8012

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .1072895   .0600166     1.79   0.084    -.0154583    .2300372
       _cons |  -1795.079   1034.747    -1.73   0.093    -3911.373    321.2159
-------------+----------------------------------------------------------------
         rho |   .4404093
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.118444
Durbin-Watson statistic (transformed) 2.059138



prais ch4 fecha if mes==4, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = -0.1252
```

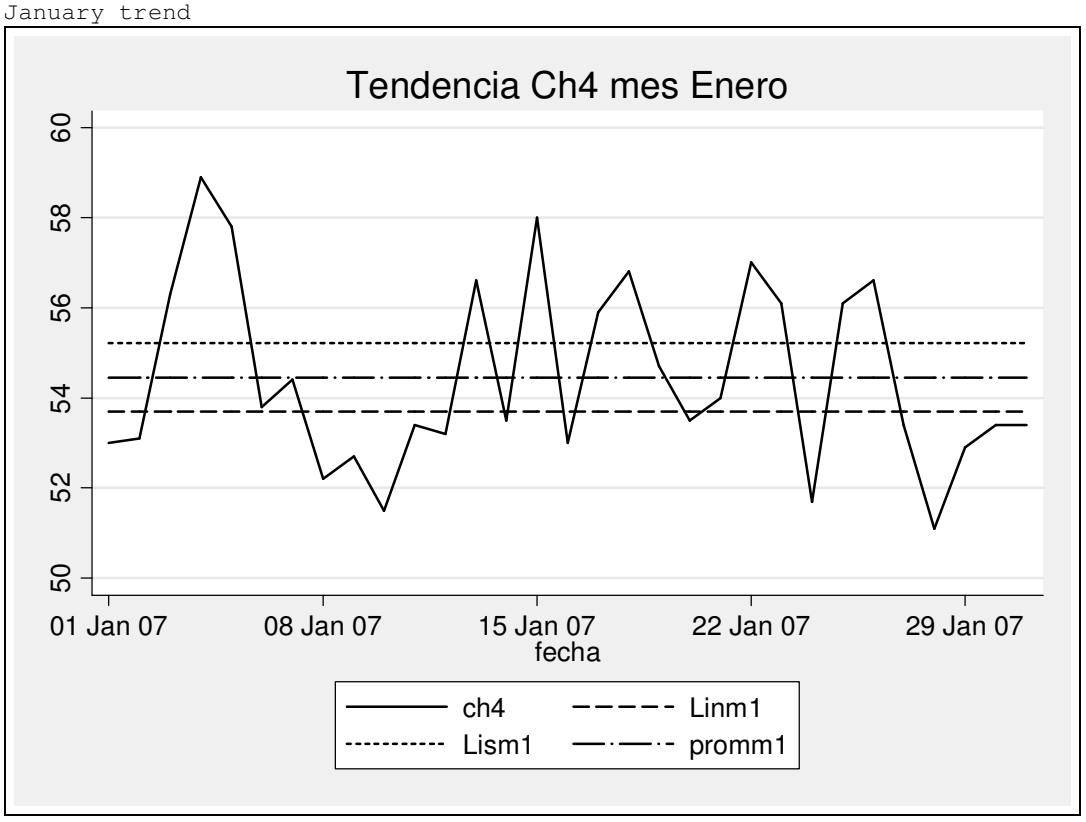
```
Iteration 2:  rho = -0.1275
Iteration 3:  rho = -0.1275
Iteration 4:  rho = -0.1275

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  1,    28) =   76.70
       Model |  156.025655     1  156.025655           Prob > F      =  0.0000
    Residual |  56.9561363    28  2.03414772           R-squared     =  0.7326
-------------+------------------------------           Adj R-squared =  0.7230
       Total |  212.981792    29  7.34419971           Root MSE      =  1.4262

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .1034749   .0269873     3.83   0.001      .048194    .1587558
       _cons |  -1729.444   466.1107    -3.71   0.001    -2684.229   -774.6597
-------------+----------------------------------------------------------------
         rho |  -.1274905
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    2.113158
Durbin-Watson statistic (transformed) 1.841034



. prais ch4 fecha if mes==5, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.2206
Iteration 2:  rho = 0.2242
Iteration 3:  rho = 0.2243
Iteration 4:  rho = 0.2243
Iteration 5:  rho = 0.2243

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =   78.23
       Model |  238.144205     1  238.144205           Prob > F      =  0.0000
    Residual |  88.2839667    29  3.04427471           R-squared     =  0.7295
-------------+------------------------------           Adj R-squared =  0.7202
       Total |  326.428172    30  10.8809391           Root MSE      =  1.7448

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |  -.1317767   .0439315    -3.00   0.006    -.2216267   -.0419267
       _cons |   2335.103   760.1028     3.07   0.005     780.5181    3889.688
-------------+----------------------------------------------------------------
         rho |   .2242727
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.489209
Durbin-Watson statistic (transformed) 1.900208
```

```
prais ch4 fecha if mes==6, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.3833
Iteration 2:  rho = 0.3840
Iteration 3:  rho = 0.3840
Iteration 4:  rho = 0.3840

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  1,    28) =   38.89
       Model |  261.194763     1  261.194763           Prob > F      =  0.0000
    Residual |  188.076101    28  6.71700362           R-squared     =  0.5814
-------------+------------------------------           Adj R-squared =  0.5664
       Total |  449.270864    29  15.4920988           Root MSE      =  2.5917

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .1151592   .0835022     1.38   0.179    -.0558872    .2862056
       _cons |  -1942.757   1447.301    -1.34   0.190     -4907.42    1021.905
-------------+----------------------------------------------------------------
         rho |   .3840335
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.223821
Durbin-Watson statistic (transformed) 1.889583



prais ch4 fecha if mes==7, rhotype(regress)

Iteration 0:  rho = 0.0000
Iteration 1:  rho = 0.3998
Iteration 2:  rho = 0.4006
Iteration 3:  rho = 0.4006
Iteration 4:  rho = 0.4006

Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =  174.19
       Model |  278.713055     1  278.713055           Prob > F      =  0.0000
    Residual |  46.4002245    29  1.60000774           R-squared     =  0.8573
-------------+------------------------------           Adj R-squared =  0.8524
       Total |  325.113279    30  10.8371093           Root MSE      =  1.2649

------------------------------------------------------------------------------
         ch4 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       fecha |   .3113099   .0397828     7.83   0.000      .229945    .3926748
       _cons |  -5345.851   690.7484    -7.74   0.000     -6758.59   -3933.112
-------------+----------------------------------------------------------------
         rho |   .4006462
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    1.197468
Durbin-Watson statistic (transformed) 2.156172

.
```

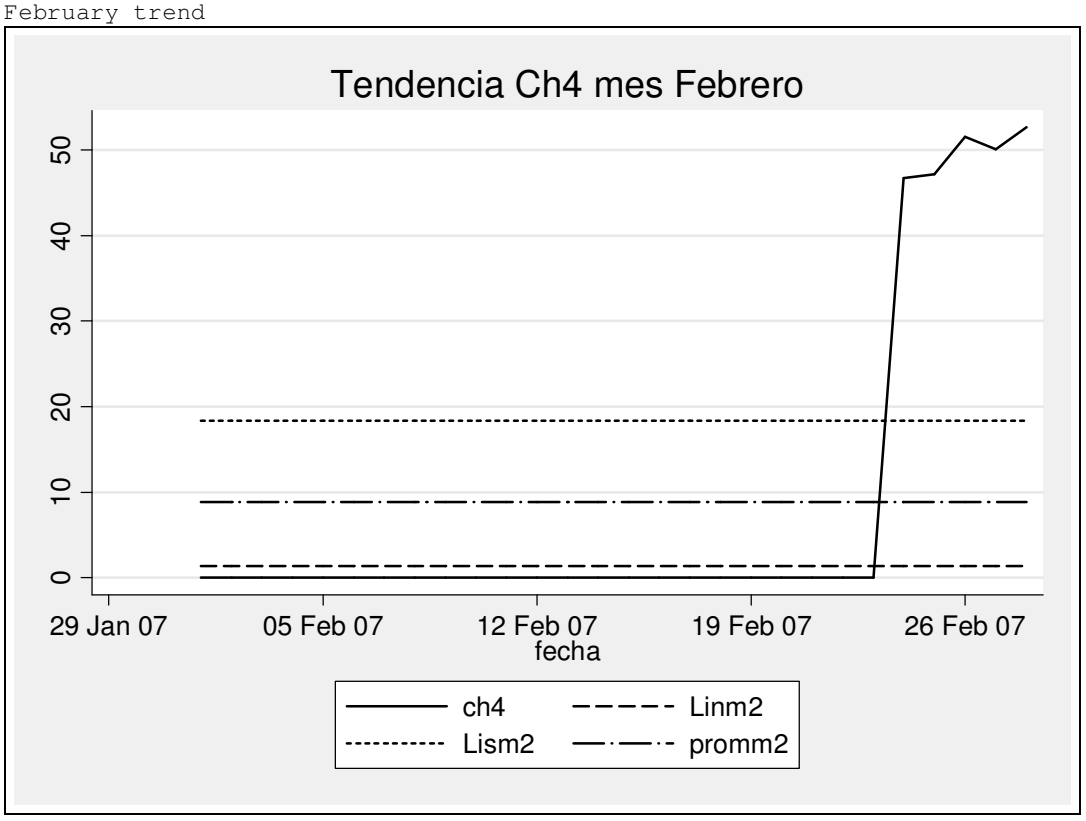
December trend



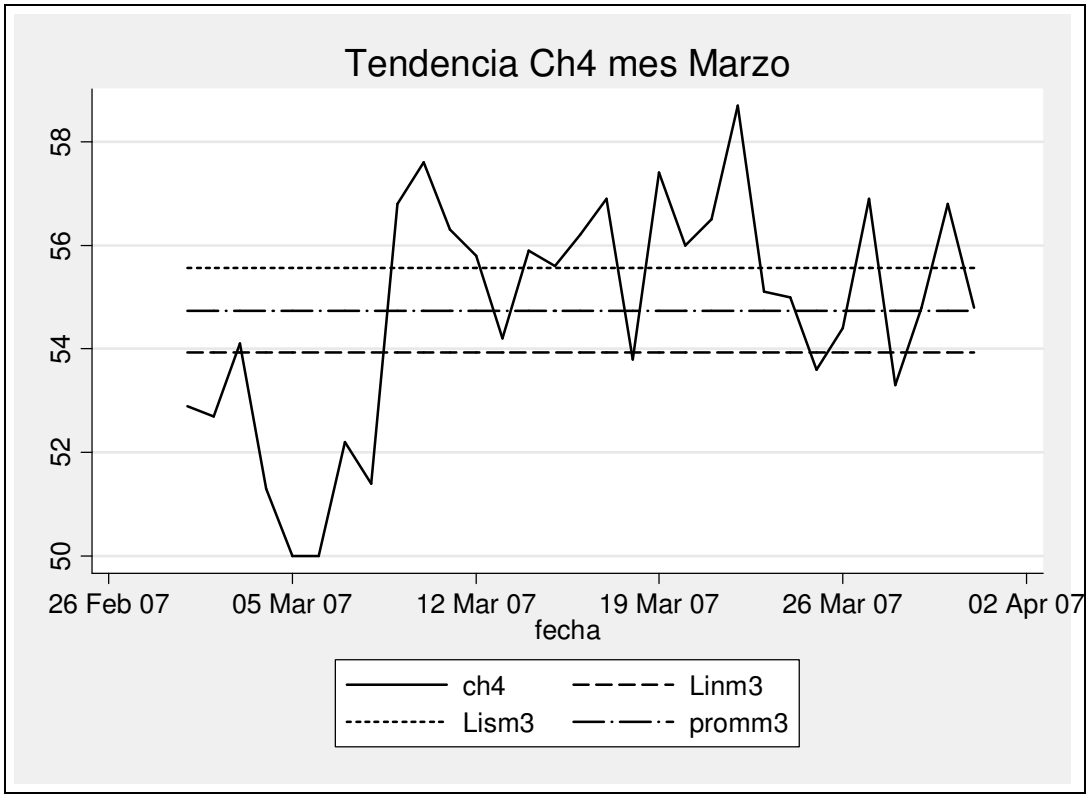
January trend



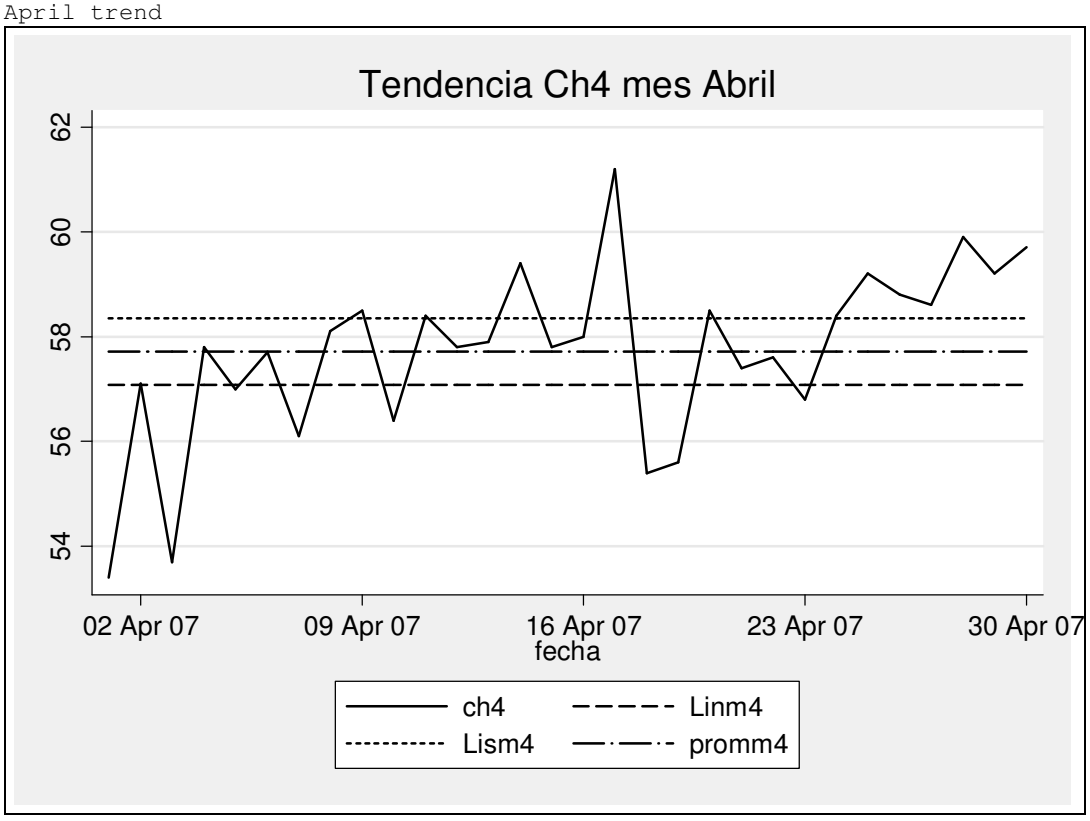
February trend



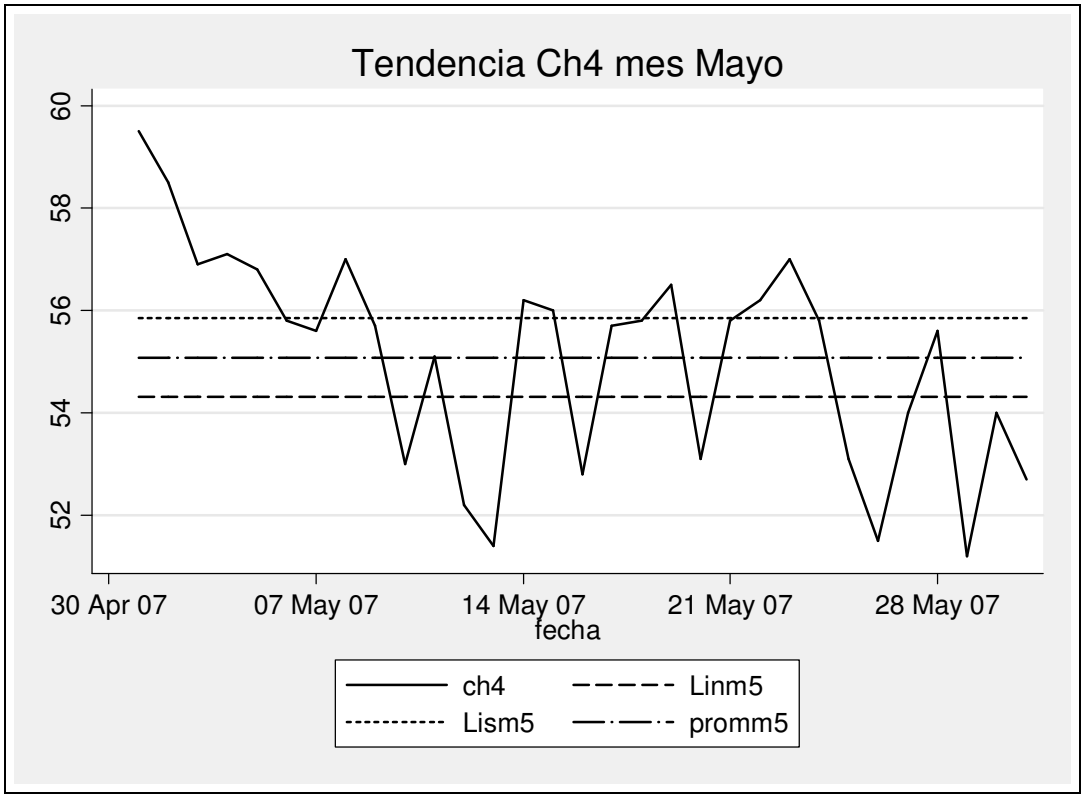
March trend



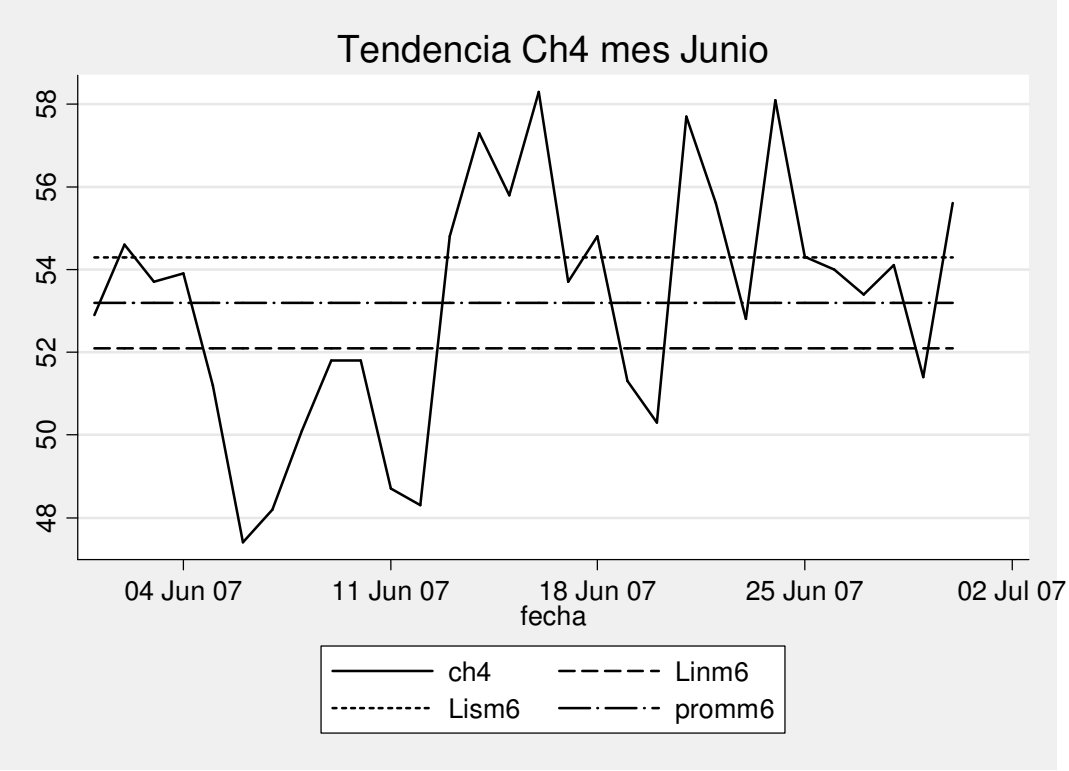
April trend



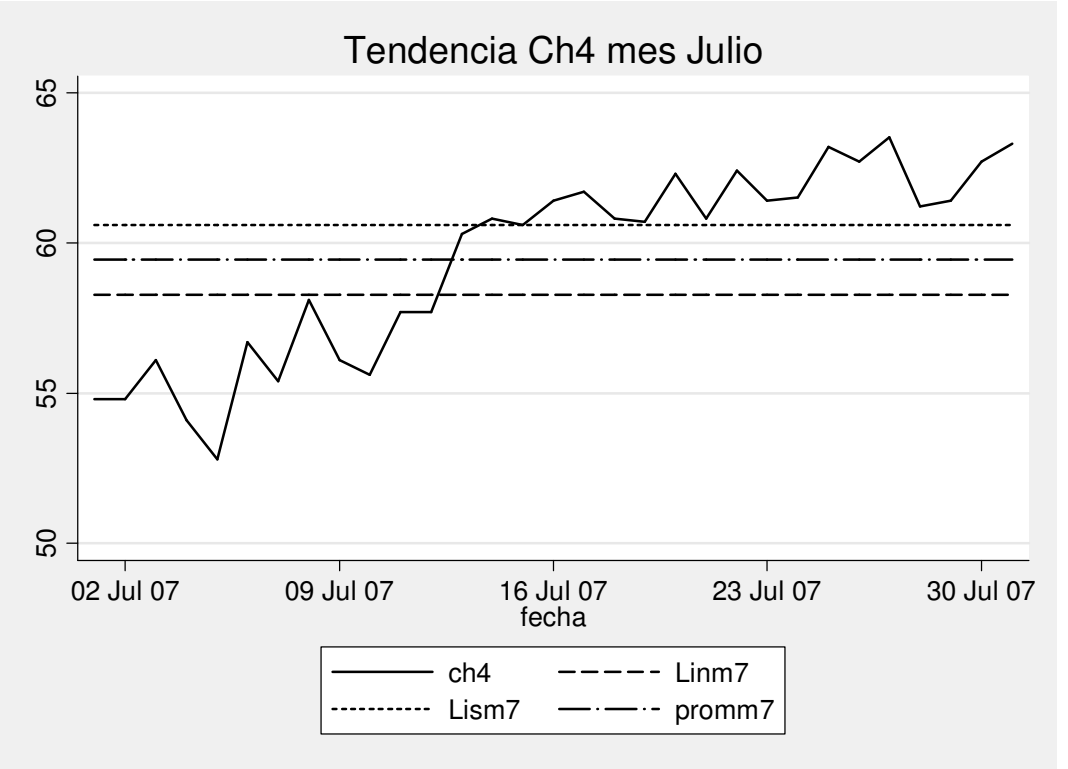
May trend



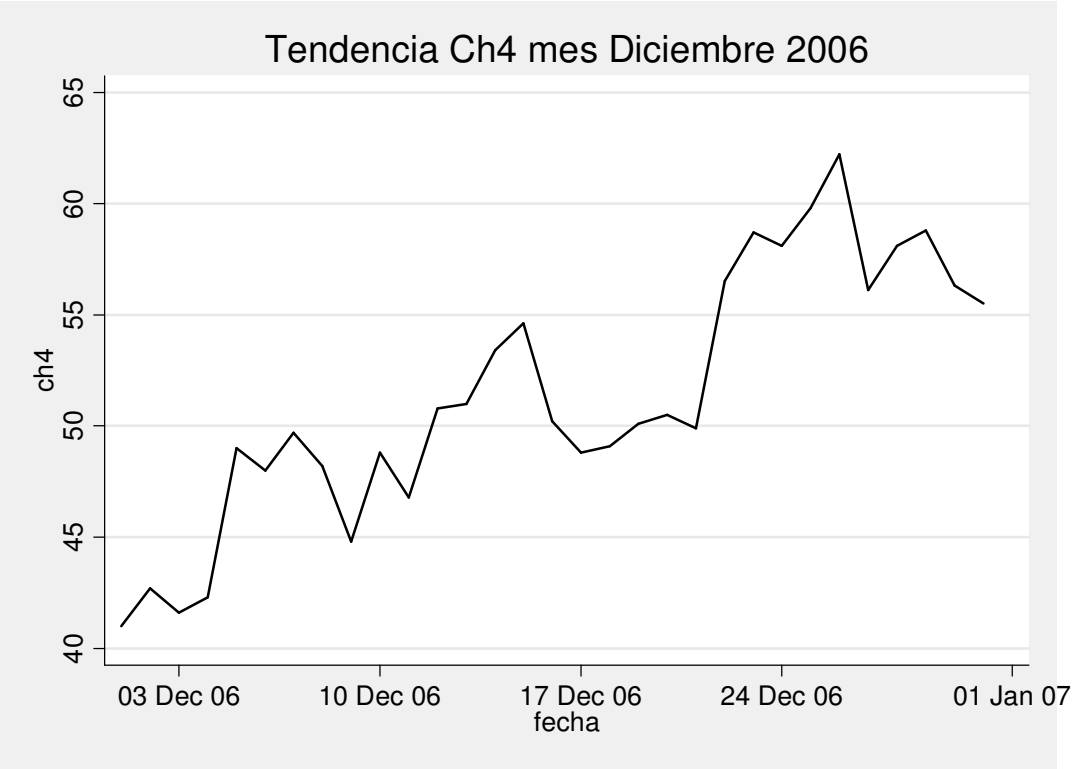
June trend



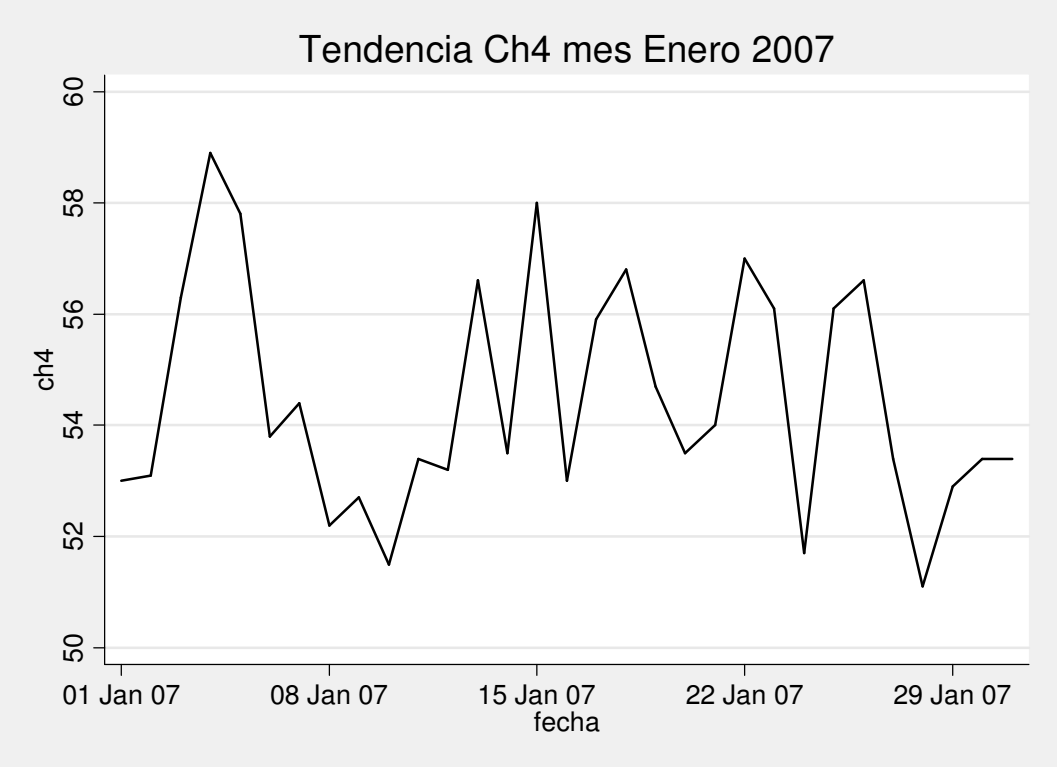
July trend



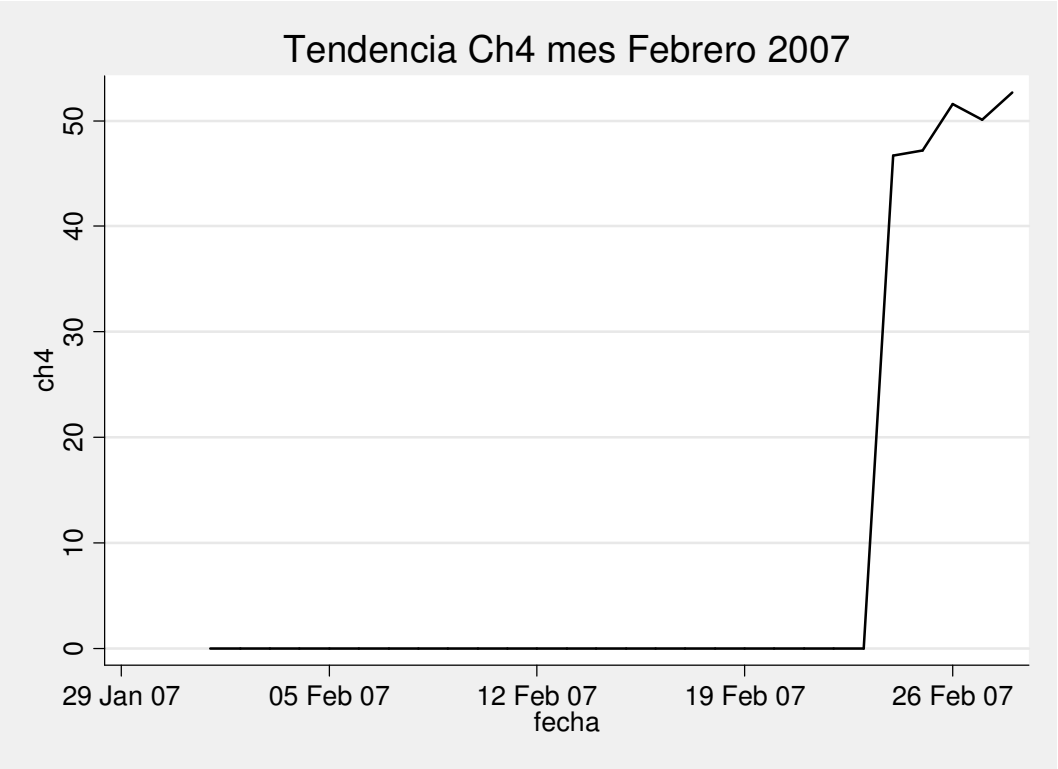
December trend



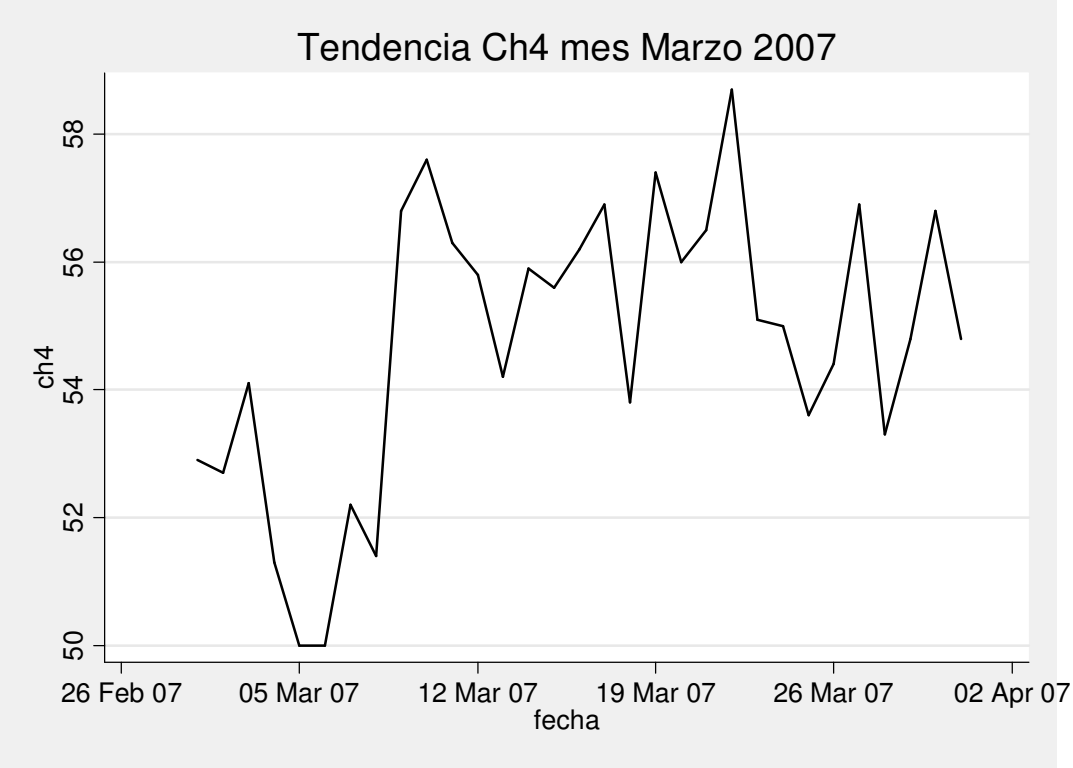
January trend



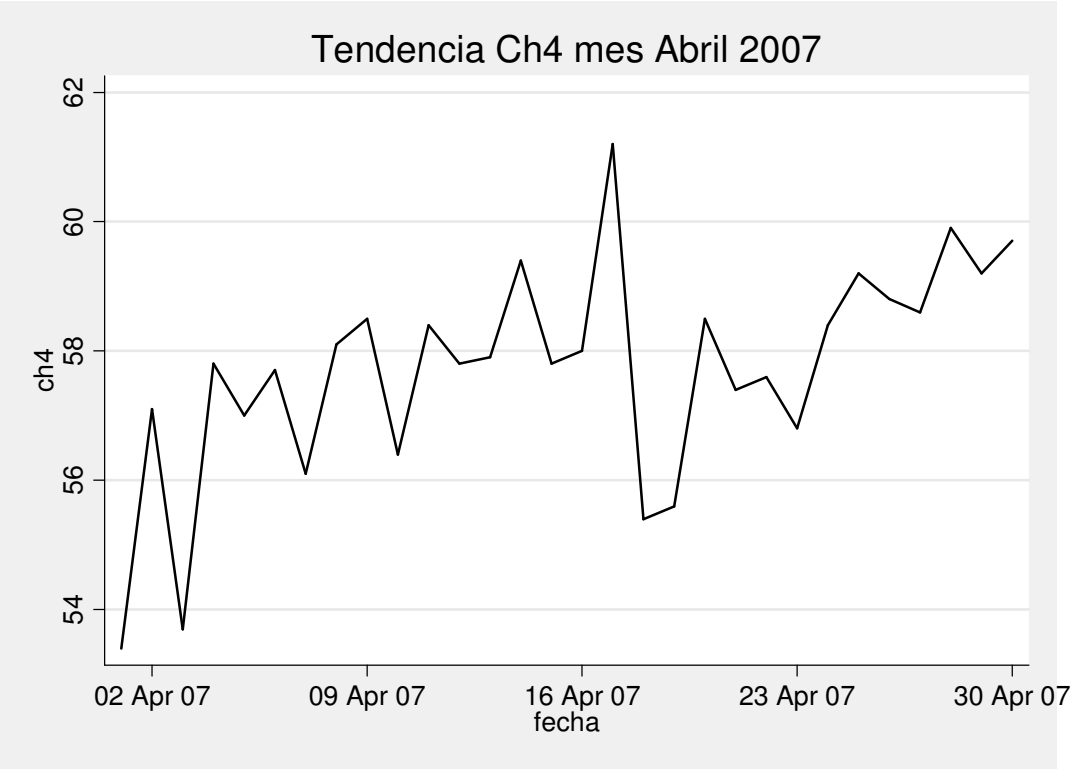
February trend



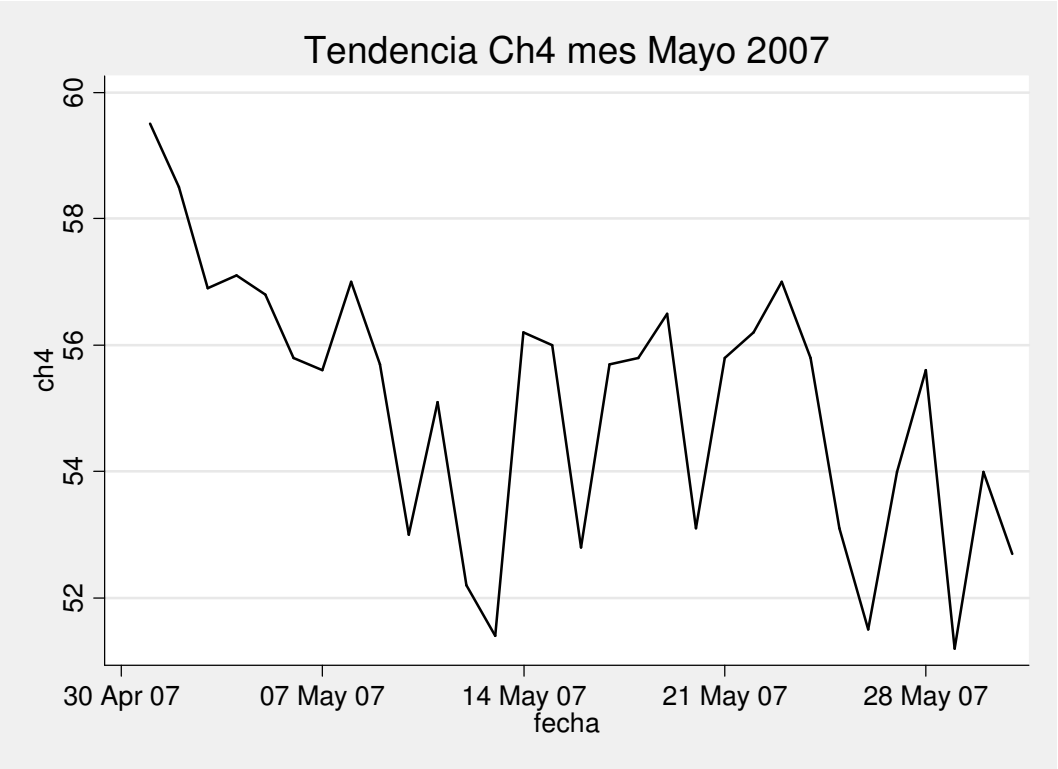
March trend



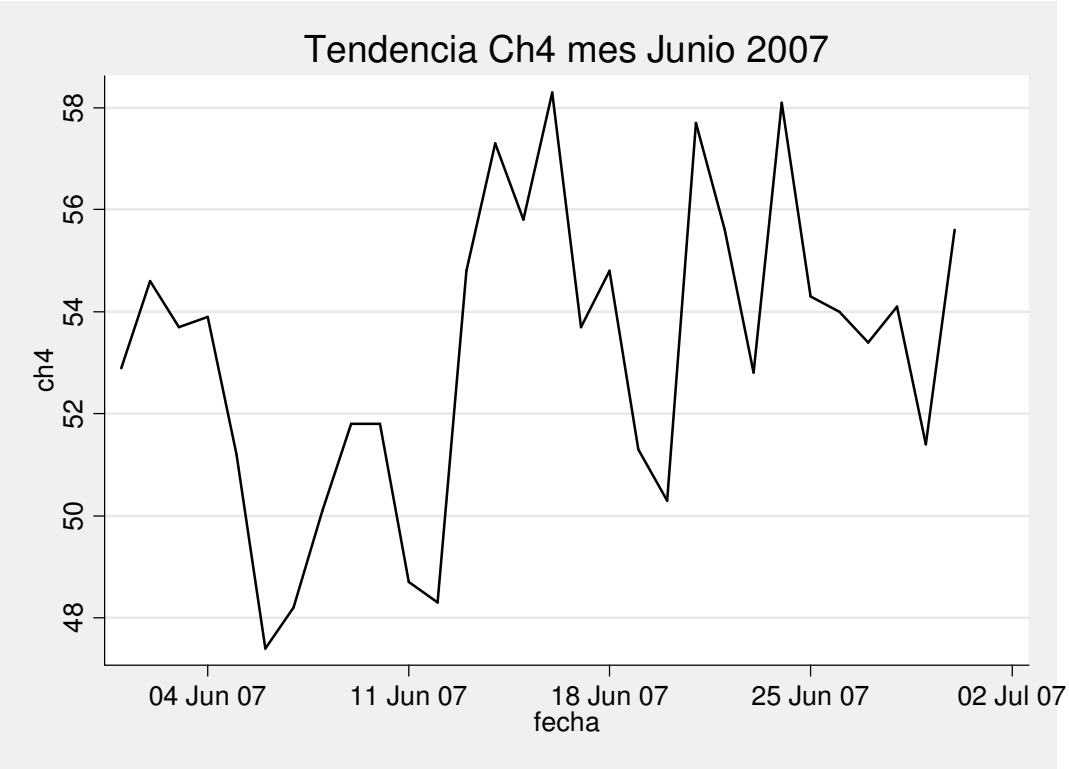
April trend



May trend



June trend



July trend