

The quality of EuroTEPS vs EPS after the latest cycle updates

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EuroTEPS with EDA:

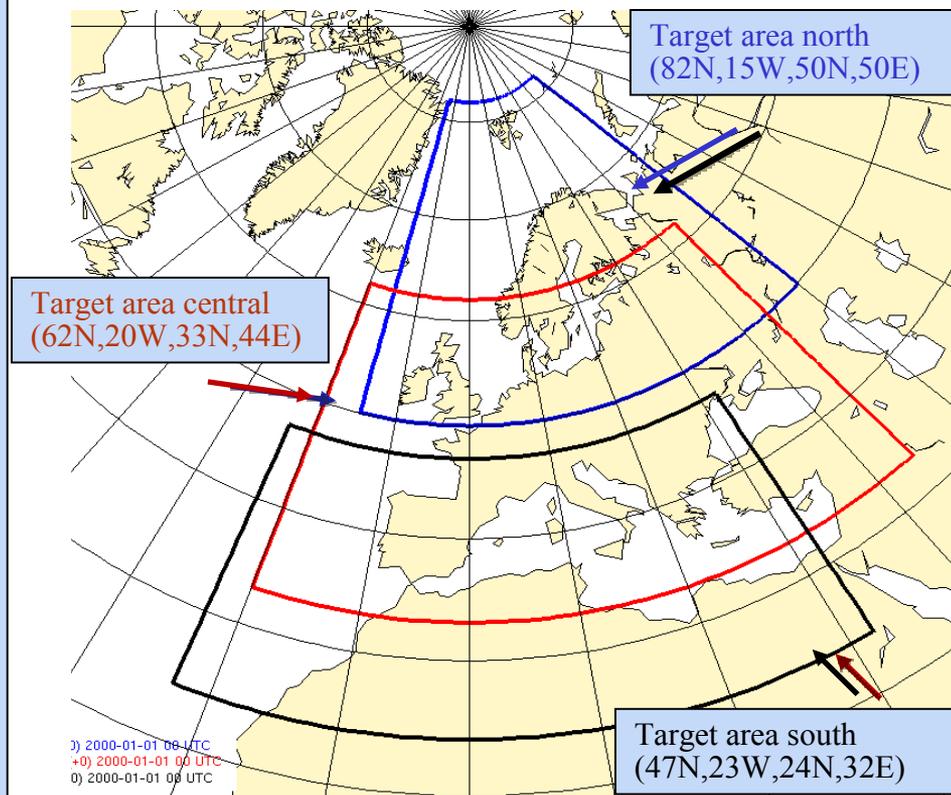
The Targeted Singular vectors (TSVs):

- Computed for three areas
- T159 (as opposed to T42 for operational SVs at ECMWF=NHSV)
- 24h optimization time (as opposed to 48h for operational SVs at ECMWF)
- Diabatic
- The TSVs are selected to be orthogonal to the operational SVs and also mutually orthogonal

The perturbations:

The perturbations from which TEPS runs is made from a combination of the following SVs using Gaussian sampling:

- 10 TSVs from each of the three European target areas
 - 50 SVs from the operational EPS (NHSVs)
- Added to the EDA perturbations



Target areas presently used in EuroTEPS



Typically the result before the inclusion of EDA in EPS and EuroTEPS was a small improvement of EuroTEPS over EPS.

There was a need for additional spread in the beginning of the forecast.

EDA was promising for EuroTEPS, because it gave larger spread in the beginning of the forecast

However, with the inclusion of EDA perturbations, the relative importance of the SVs and TSVs are reduced, i.e. amplitude reduced by more than 50% ->

IS TARGETING STILL WORTH THE EFFORT?



- Different amplitudes can be assigned to the different sets of SVs, to give the desirable spread/skill relationship
- Different amplitudes have been tried out

Design of experiments:

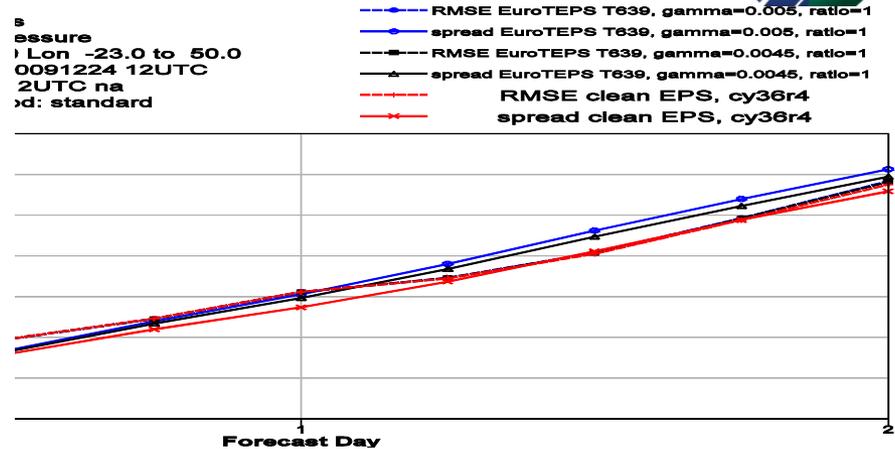
	Experiment	NHSVamp.	TSVamp.
1	“Clean” EPS (12+1)	0.006	0
2	EuroTEPS_0	0.001	0.008
3	EqAmp_1	0.005	0.005
4	EqAmp_2	0.0045	0.0045
5	EqAmp_2 and TSVs targeted to troposphere below L31 (~400hPa)	0.0045	0.0045
6	No_NHSV	0	0.005

All exp. have 12+1 members
For 14 – 21 days in autumn/winter 2009

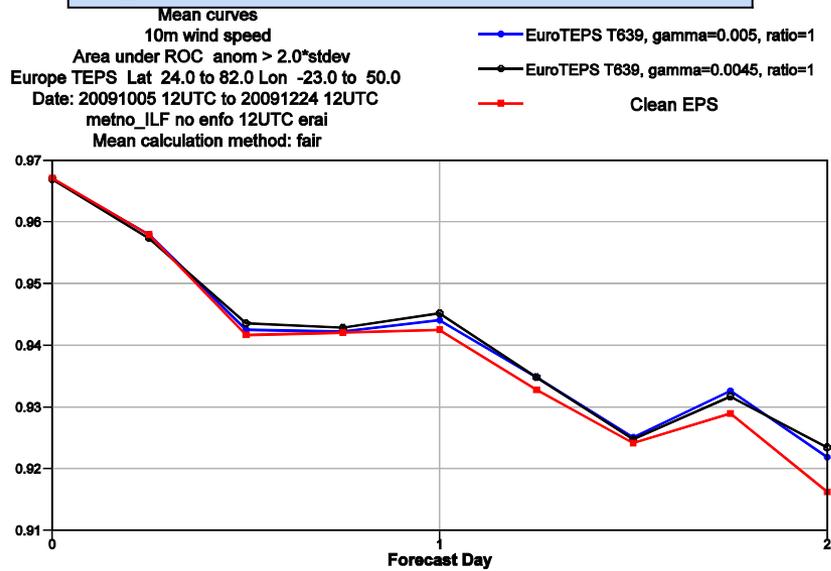
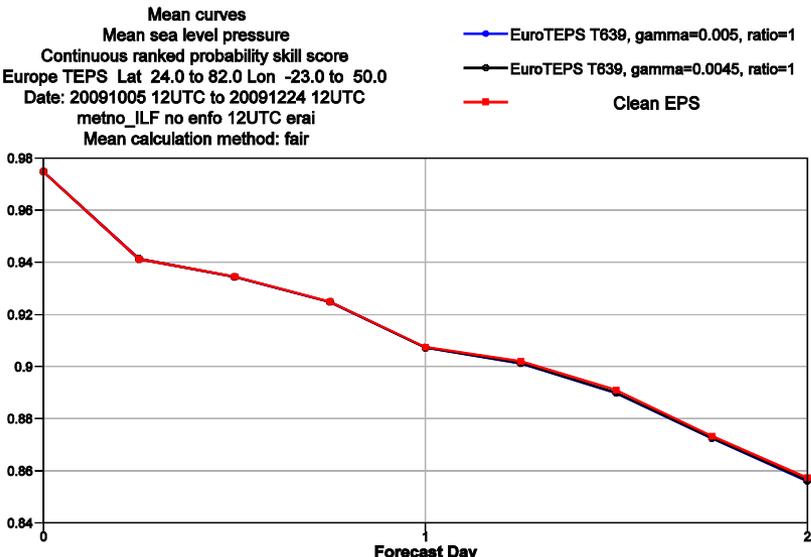
Effect of adjusting the initial SV-amplitudes when maintaining the fraction TSV/NHSV=1



A tuning experiment where the importance of TSVs and NHSVs are equal



Spread - Skill for MSLP



CRPSS for MSLP

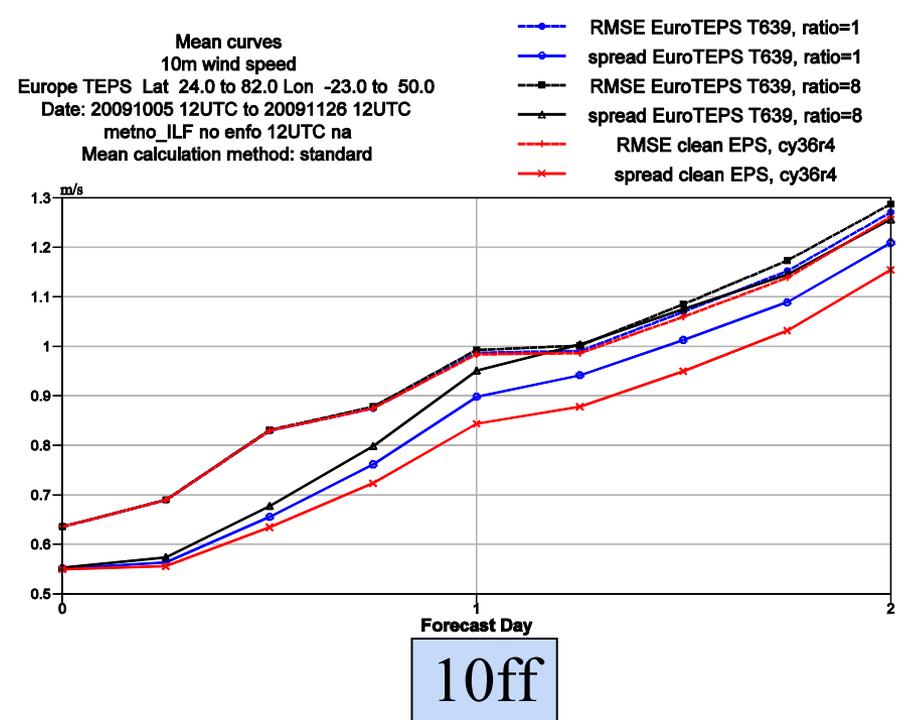
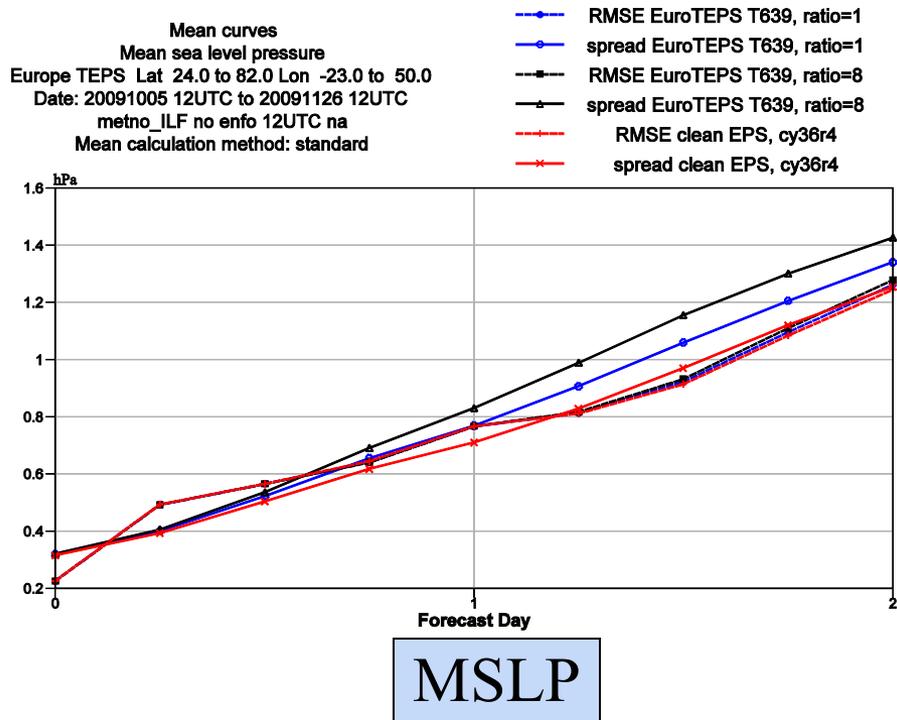
Area ROC ff10m, >2*stdev

The effect of increasing the relative importance of the TSVs



Exp trying to increase the spread in the beginning of the forecast

Spread-skill

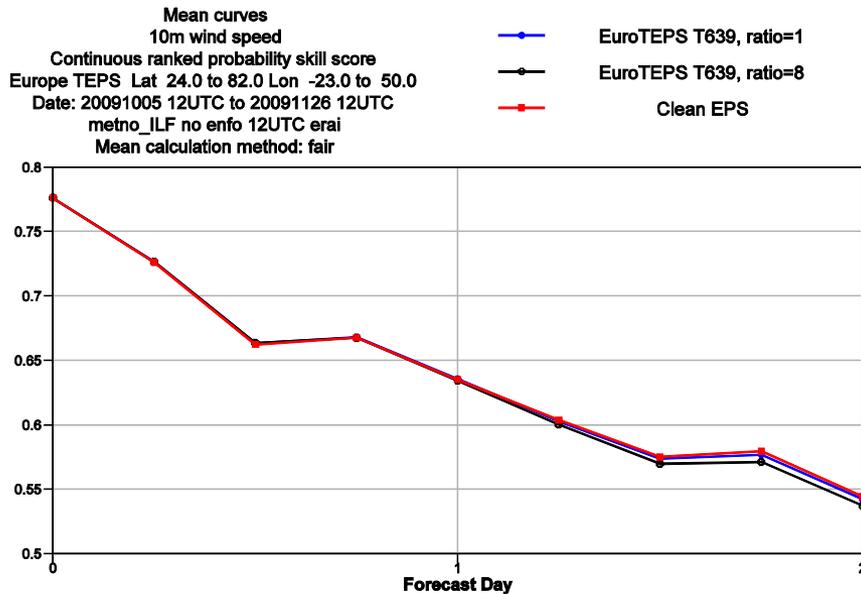


The effect of increasing the relative importance of the TSVs

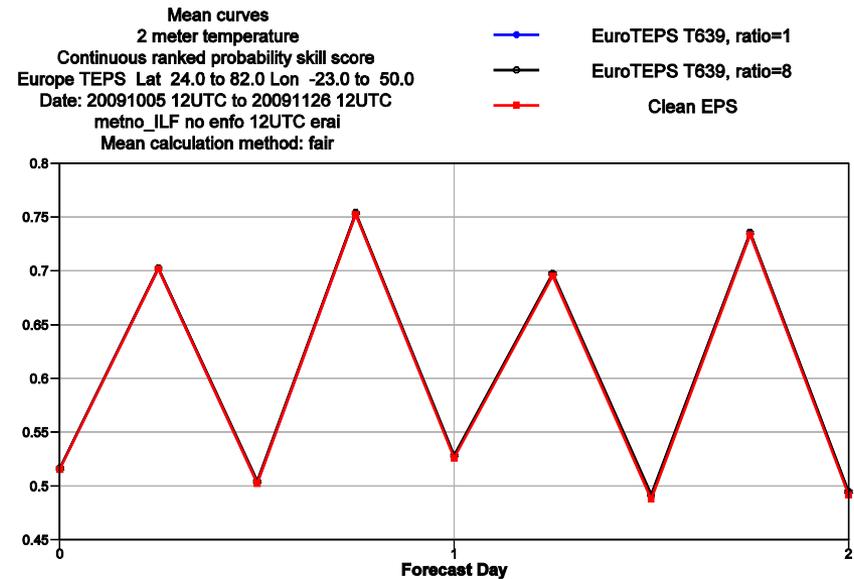


continued

CRPSS



ff10m



2T

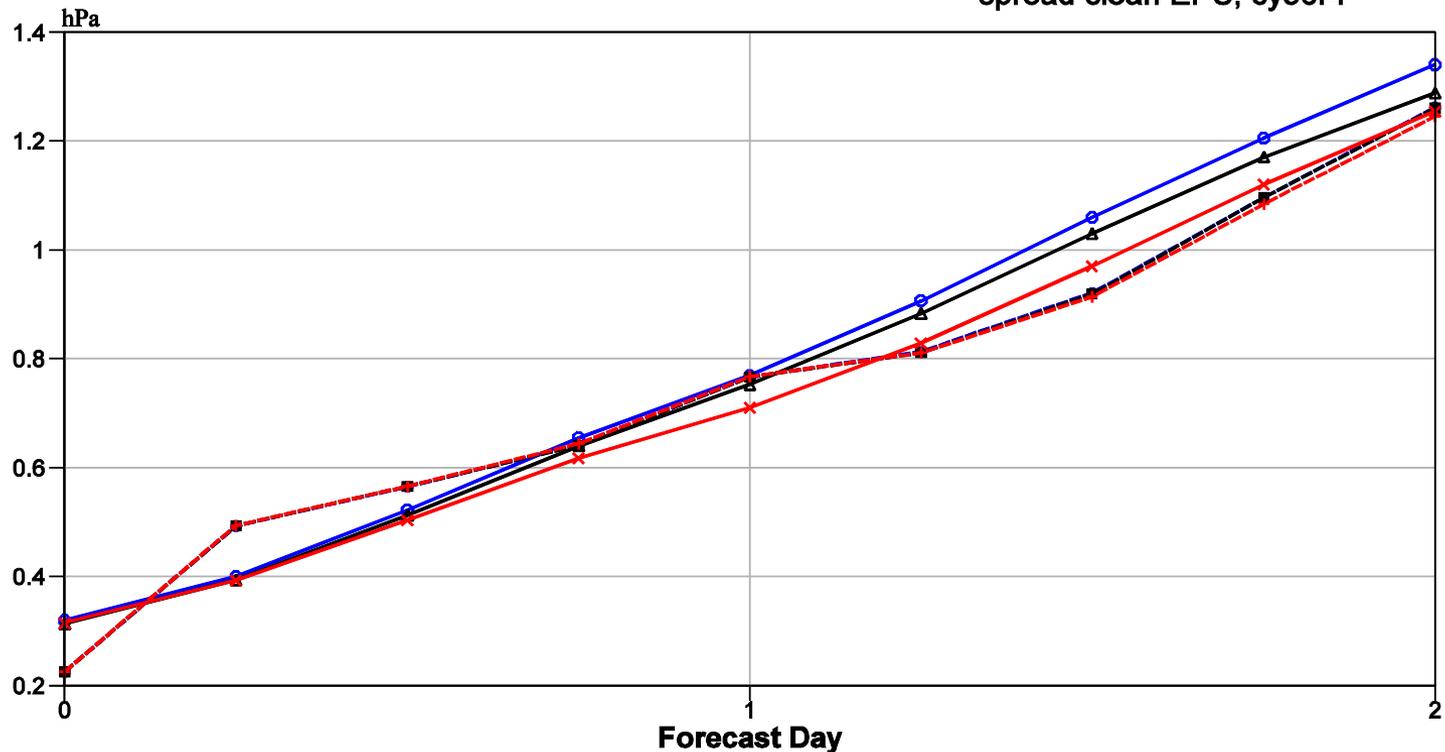
The effect of removing the dependence on NHSVs completely

Clean effect of targeting



Mean curves
Mean sea level pressure
Europe TEPS Lat 24.0 to 82.0 Lon -23.0 to 50.0
Date: 20091005 12UTC to 20091126 12UTC
metno_ILF no enfo 12UTC na
Mean calculation method: standard

- RMSE EuroTEPS T639, gamma=0.005, ratio=1
- spread EuroTEPS T639, gamma=0.005, ratio=1
- RMSE 3TEPS T639, gamma=0.005
- ▲--- spread 3TEPS T639, gamma=0.005
- +--- RMSE clean EPS, cy36r4
- x--- spread clean EPS, cy36r4



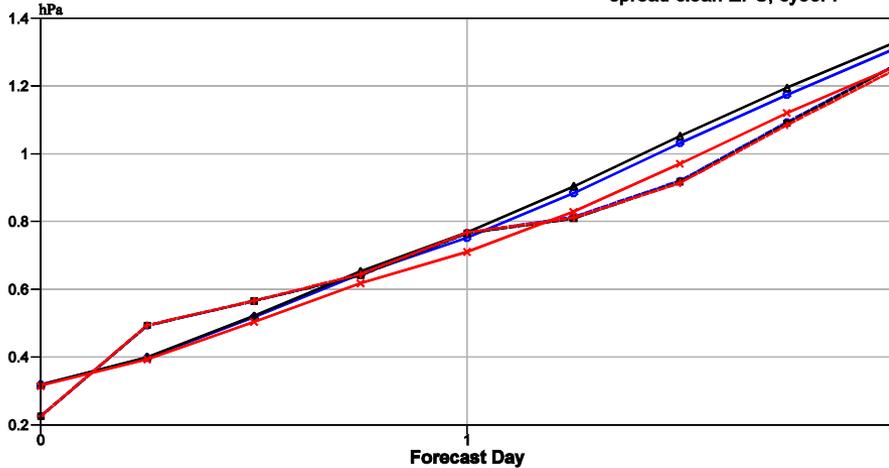
MSLP

The effect of vertical targeting of TSVs below level 31 (ca. 400hPa)



Mean curves
Mean sea level pressure
Europe TEPS Lat 24.0 to 82.0 Lon -23.0 to 50.0
Date: 20091005 12UTC to 20091126 12UTC
metno_ILF no enfo 12UTC na
Mean calculation method: standard

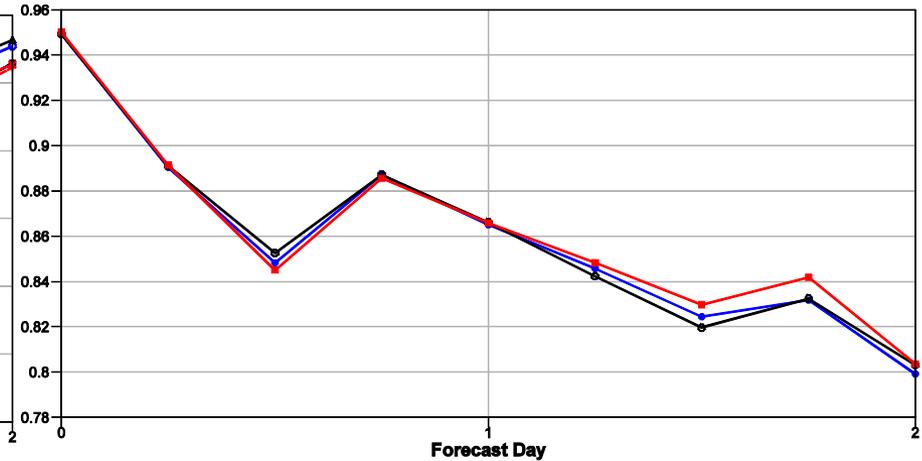
- RMSE EuroTEPS T639, gamma=0.0045, ratio=1
- spread EuroTEPS T639, gamma=0.0045, ratio=1
- RMSE EuroTEPS target lev 31 T639, gamma=0.0045
- ▲— spread EuroTEPS target lev 31 T639, gamma=0.0045
- +— RMSE clean EPS, cy36r4
- x— spread clean EPS, cy36r4



Spread-skill MSLP

Mean curves
10m wind speed
Area under ROC anom < -2.0*stdev
Europe TEPS Lat 24.0 to 82.0 Lon -23.0 to 50.0
Date: 20091005 12UTC to 20091126 12UTC
metno_ILF no enfo 12UTC era
Mean calculation method: fair

- EuroTEPS T639, gamma=0.0045, ratio=1
- EuroTEPS target lev 31 T639, gamma=0.0045, ratio=1
- Clean EPS



Area ROC ff10m
Thr: < 2.0s

Conclusion



SBUs

- TSVs for the three areas uses about 2200 SBUs
- EuroTEPS 48h run, 12+1 members, T639L62 about 4500 SBUs
- ~5 mill SBU for one year

After the inclusion of EDA the relative importance of the SVs is reduced, so also the impact of the TSVs.

Several tests have been made with different configurations of NHSVs/TSVs and there is no longer any clear positive impact of targeting.

On the basis of these tests we recommend to stop the development of EuroTEPS.