Update on DRAKKAR Forcing Sets
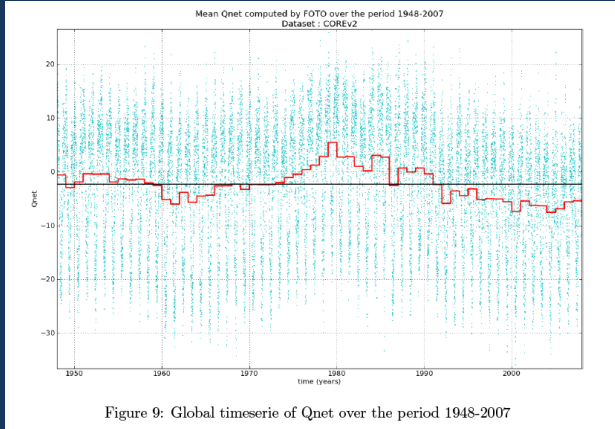

Qnet CORE2

Qnet DFS4.4

Qnet DFS5.2

Co-authors: R. Dussin (Rutgers U.), J.M. Molines (LGGE), S. Josey (NOCS), S. Gulev (SIO), L. Brodeau (MISU)

ECMWF ReAnalyses

ERA40

1958-2001
1.165° resolution
6 hourly

Major flaws:

- Discontinuity in 1979
- Radiation
- Precipitation

ERAi

1979-2013
0.75° resolution
3 hourly

Major flaws:

- Precipitation

All studies: ERAi represents a major improvement compared to ERA40.

DFS Challenge:
Combine ERA40, ERAi, and other products (e.g. Satellite, …) to produce a data set of surface atmospheric variables to drive DRAKKAR global model configurations for the period 1958 to present.

DFS4.4 (1.1625°)

t2,q2, U1O
1958-2001: 6h ERA40 with corrections
2002-2012: 6h ERAi "rescaled" on ERA40 mean

RadSW, radLW (ISCCP with correction)
1958-1983: Monthly Climatology
1984-2007: Daily
2008-2012: repeat 2007

Precipitation (CORE)
1958-1978: monthly mean climatology
1979-2009: Daily

Heavy processing to update to present

DFS5.2 (0.7°)

t2,q2, U1O
1958-1978: 3*h ERA40 with corrections, "rescaled" on ERAi .
1979-2012: 3h ERAi with corrections (DFS5.1)

RadSW, RadLW (ERAi with correction to GEWEX)
1958-1978: daily climatology
1978-2012: daily (DFS5.1)

Precipitation
1958-1978: ERAi corrected daily climatology
1979-2012: daily ERAi corrected (DFS5.1)

"Easy" processing to update to present
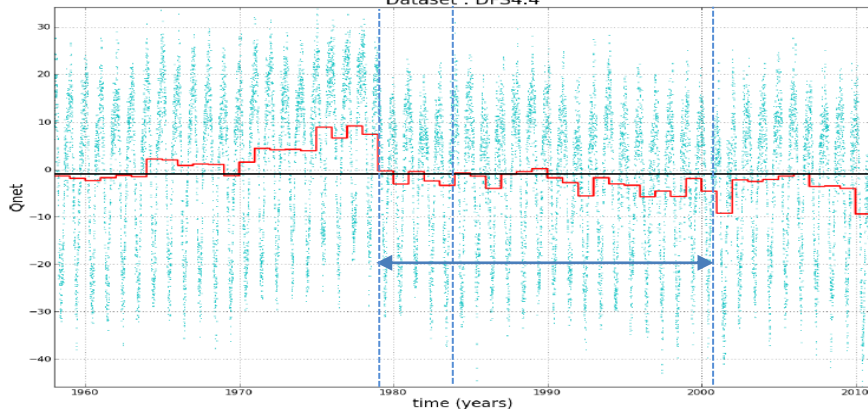
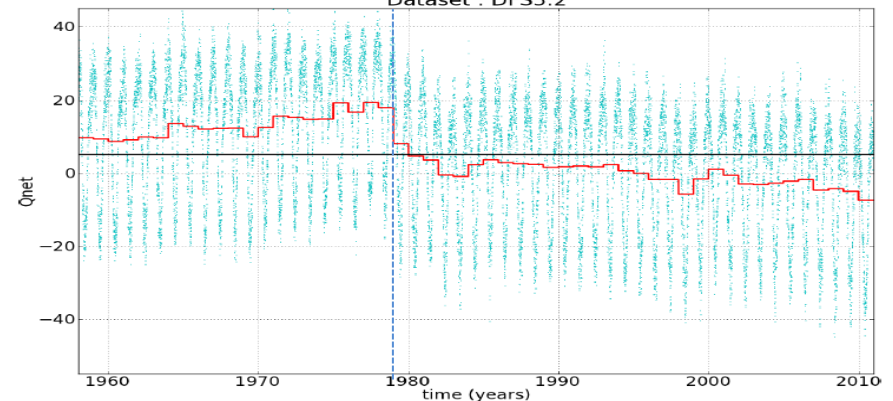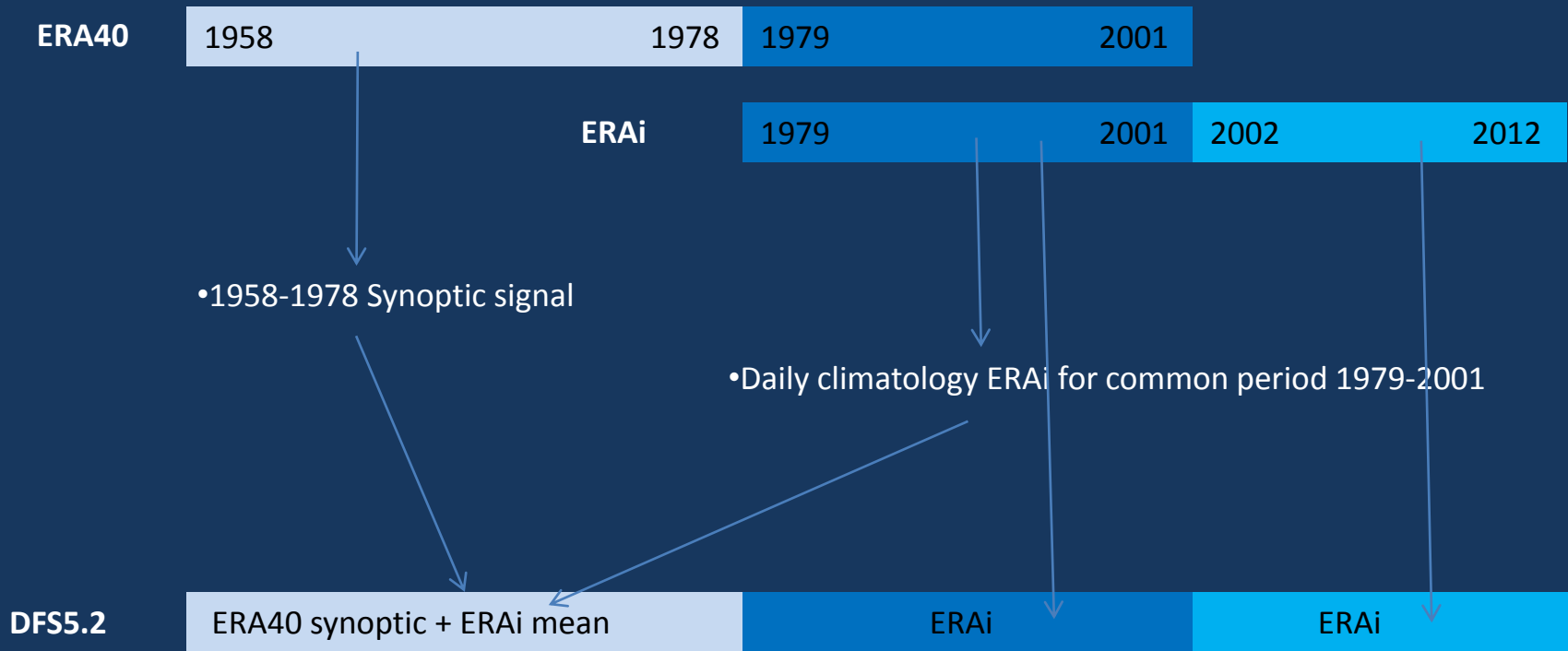Figure 66: Global timeserie of Qnet over the period 1958-2010

Figure 75: Global timeserie of Qnet over the period 1958-2010

"Re-scaling" on SAS variables

6h Synoptic signal = 6h total signal − climatological daily mean

ERA40	1958 1978	1979 2001	

ERAi		1979 2001	2002 2012

• 1958-1978 Synoptic signal

• Daily climatology ERAi for common period 1979-2001

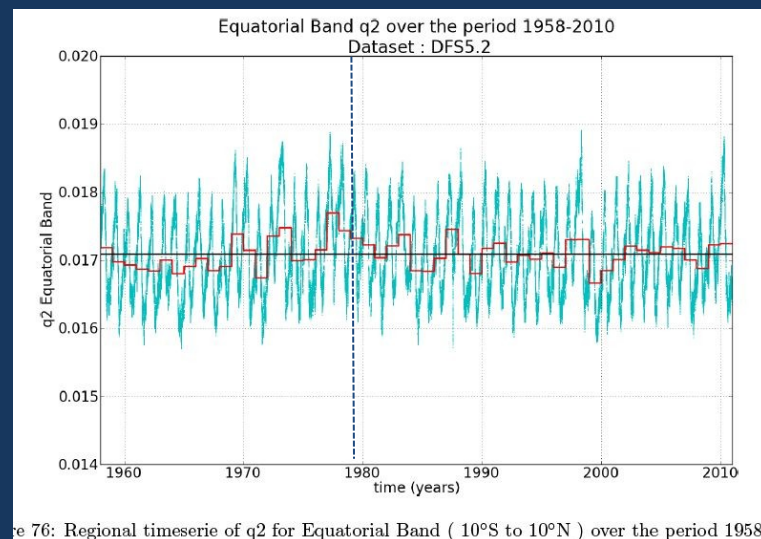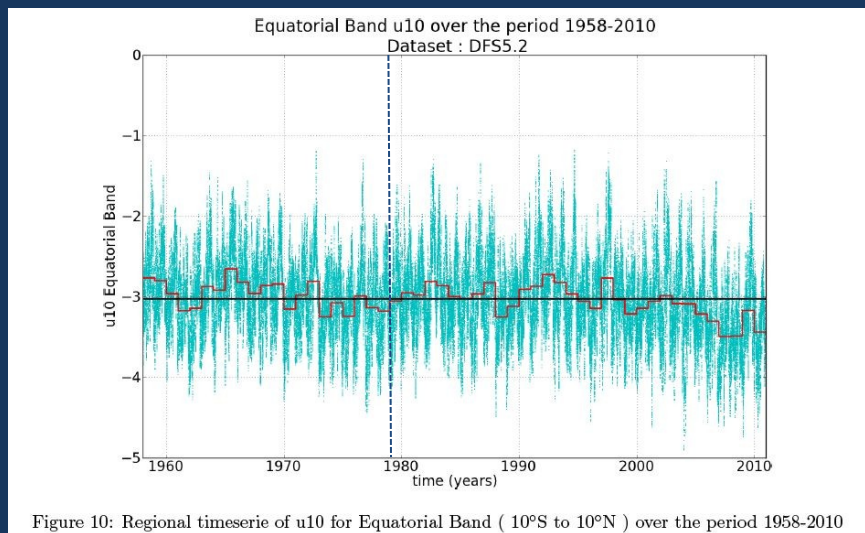| DFS5.2	ERA40 synoptic + ERAi mean	ERAi	ERAi

"Re-scaling" on SAS variables

6h Synoptic signal = 6h total signal – climatological daily mean

DFS5.2 continuity issue on Evaporation/Qlat at tropical latitudes before release

Figure 10: Regional timeserie of u10 for Equatorial Band (10°S to 10°N) over the period 1958-2010

re 76: Regional timeserie of q2 for Equatorial Band (10°S to 10°N) over the period 1958-

U10   x   q2   =

Qlat

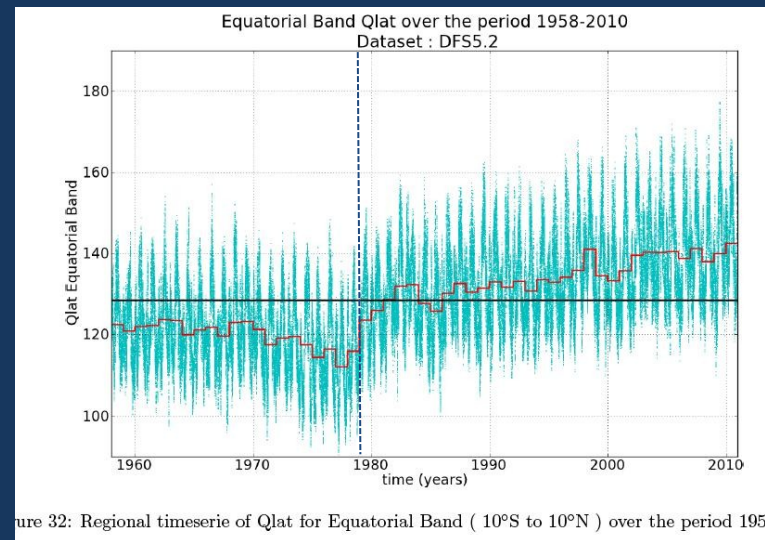ure 32: Regional timeserie of Qlat for Equatorial Band (10°S to 10°N) over the period 1958-

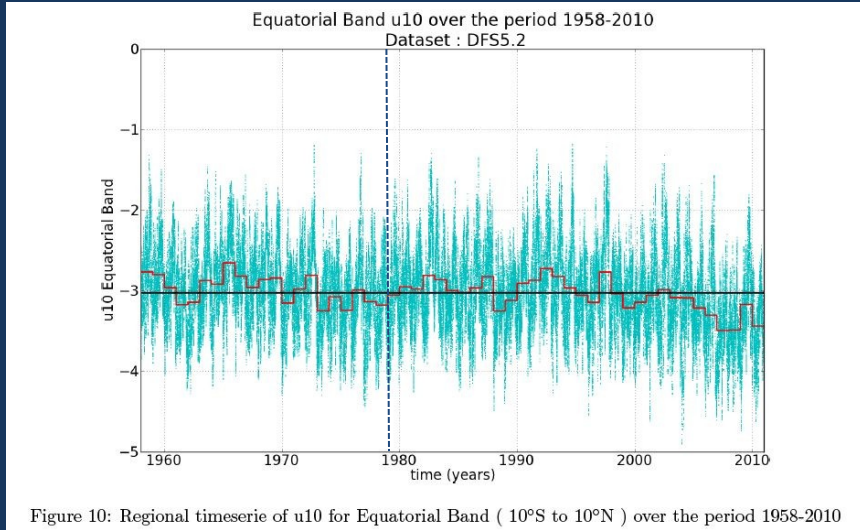# DFS5.2 continuity issue on Evaporation/Qlat at tropical latitudes before release

Figure 10: Regional timeserie of u10 for Equatorial Band (10°S to 10°N) over the period 1958-2010
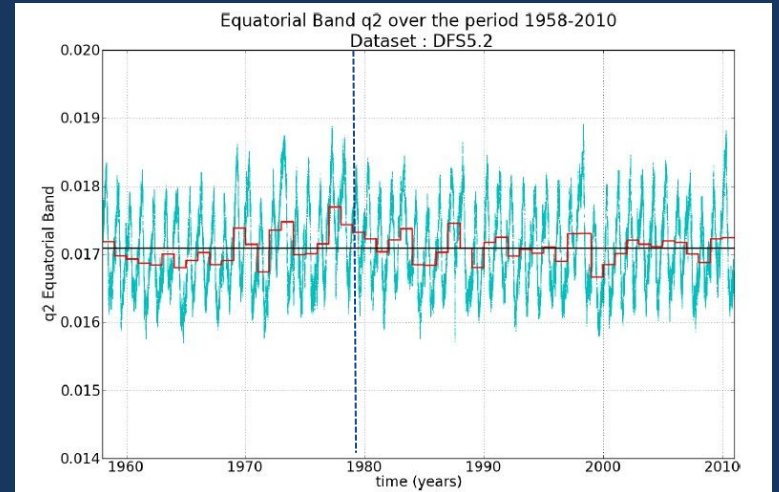

re 76: Regional timeserie of q2 for Equatorial Band (10°S to 10°N) over the period 1958-

U10   x   q2   =

Qlat

With impact on Qnet

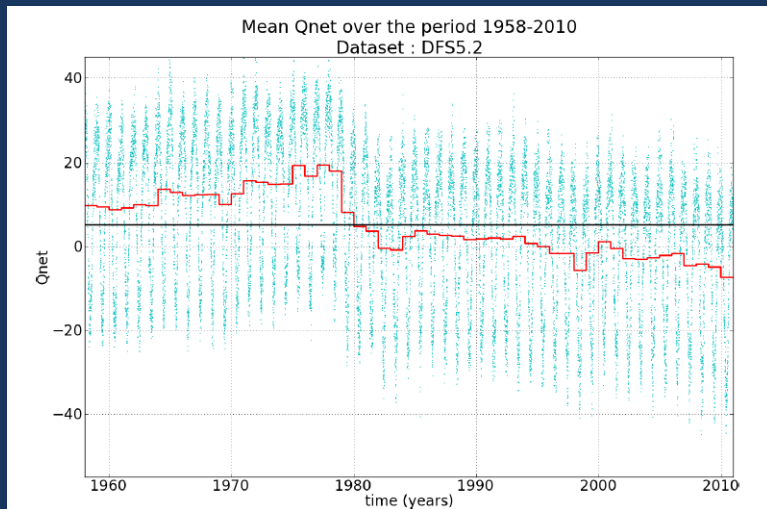Figure 75: Global timeserie of Qnet over the period 1958-2010
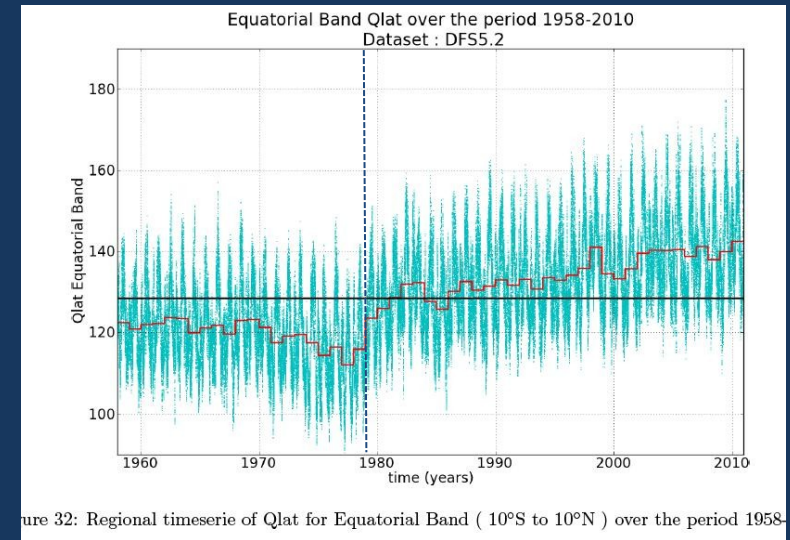

ure 32: Regional timeserie of Qlat for Equatorial Band (10°S to 10°N) over the period 1958-

DFS5.2/DFS5.1 global budgets (1979-2012)

Heat budget

	Qnet (global,W/m2)
ERA-interim+	5.34
ERA-interim + wind corr (multiplicative factor, as DFS4)	-5.65
ERA-interim + wind corr (background term, mean boost)	+0.83
ERA-interim + wind corr 80% of (background term, mean boost)	+1.57
DFS5.1 (wind + radiatives correction)	-2.24

Freshwater budget

	ERAinterim	DFS 5.1 : (correction de vents a 80%)
Precip:	3.16 mm/day	2.89 mm/day
Evap:	3.71 mm/day	3.83 mm/day
E-P:	0.55 mm/day	0.94 mm/day
E-P-R	0.33 mm/day	0.72 mm/day

To reach a balance: increase P by 14%

CONCLUSIONS

- DFS5.2 will be available as soon as "discontinuity" issue is solved
- Special patch (from ERA dowscaling) over Med Sea

- Report on the Making of DFS5.1 (i.e. DFS5.2 over 1979-2012) available

- Report (paper) on DFS5.2 (1958-2012 in preparation, Dussin et al., 2014)

- FARC reports available for
  - CORE2   DFS4.4   DFS5.2beta
  - ERAi   DFS5.1

- Long term trends have no values. Should we de-trend the data sets?

- What do we expect from the DFSs in the future?

  - ✓ DFS6 questionnaire
  - ✓ Thorough evaluation (climatology, trends, weather, continuity, extremes, major variability patterns such as NAO, PDO, SAM, etc.
  - ✓ Interannual AND associated climatological seasonal forcing
  - ✓ detrended forcing
  - ✓ An ensemble of interannual forcing sets (CORE, DFS, JRA, MERRA, CSFR, ERA-20C, ERAclim, …)