

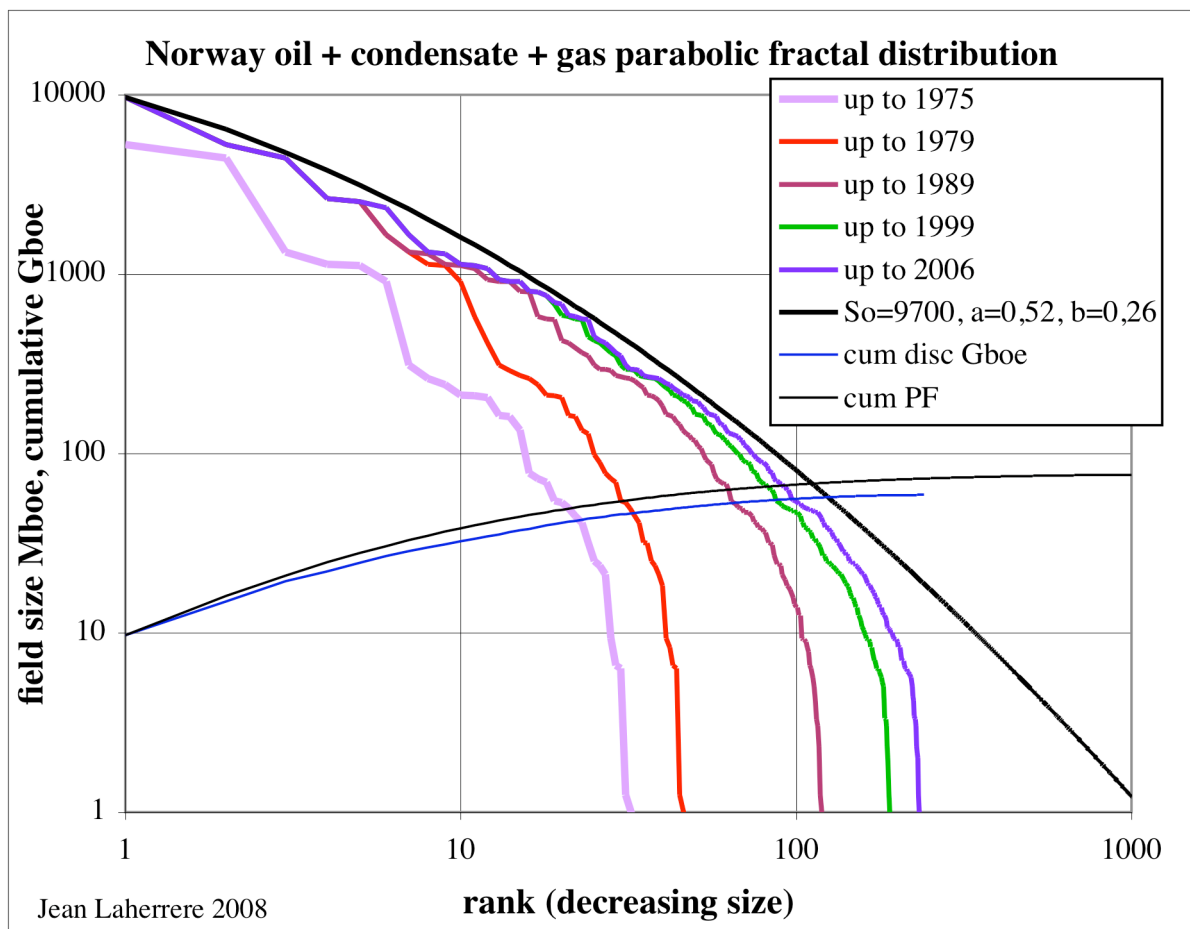
Parabolic Fractal Norway

Parabolic fractal is a good tool to study the habitat of Petroleum Systems, but it works less when used to study country distribution. Norway has several p Petroleum Systems and the main one is shared with the UK. Then a parabolic model only for Norway is not supposed to be the best tool.

Data is from IHS EDIN February 2007 and includes 4 fields shared with UK (Frigg, Statfjord, Peik, Alpha) at full value

Oil and Gas

The parabolic fractal (PF) distribution for oil +condensate and natural gas (1 boe= 6 kcf) is modelled with $S_o = 9700$ Mboe, $a=0,52$ and $b=0,26$, representative of a concentrated habitat. The habitat is dispersed for $a+b < 0,5$, normal for $0,5 < a+b < 0,75$ and concentrated for $a+b > 0,75$

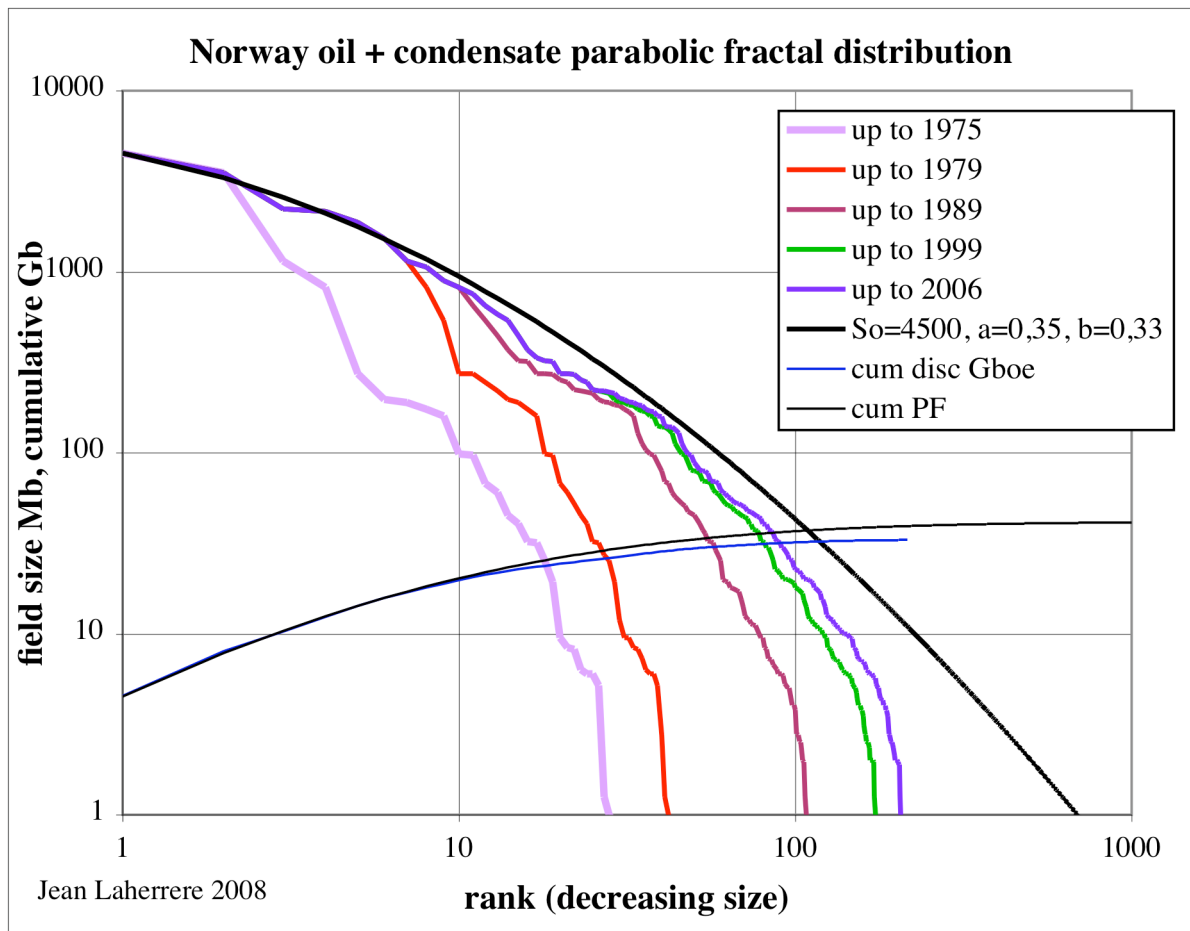


The cumulative discovery (59 Gboe end 2006 for 241 discoveries of which 194 >10 Mboe) is compared with the cumulative PF (74 Gboe for size >10 Mboe = 345 fields), but the parabolic fractal represents what could be in the ground and not exactly what will be found. For that it is better to use the creaming curve.

Out of the 24 giants, 23 were discovered before 1999, 19 before 1989, 11 before 1979.

Oil and Condensate

The parabolic fractal is modelled with $S_o = 4500$ Mb, $a = 0,35$ and $b = 0,33$, representing a normal habitat

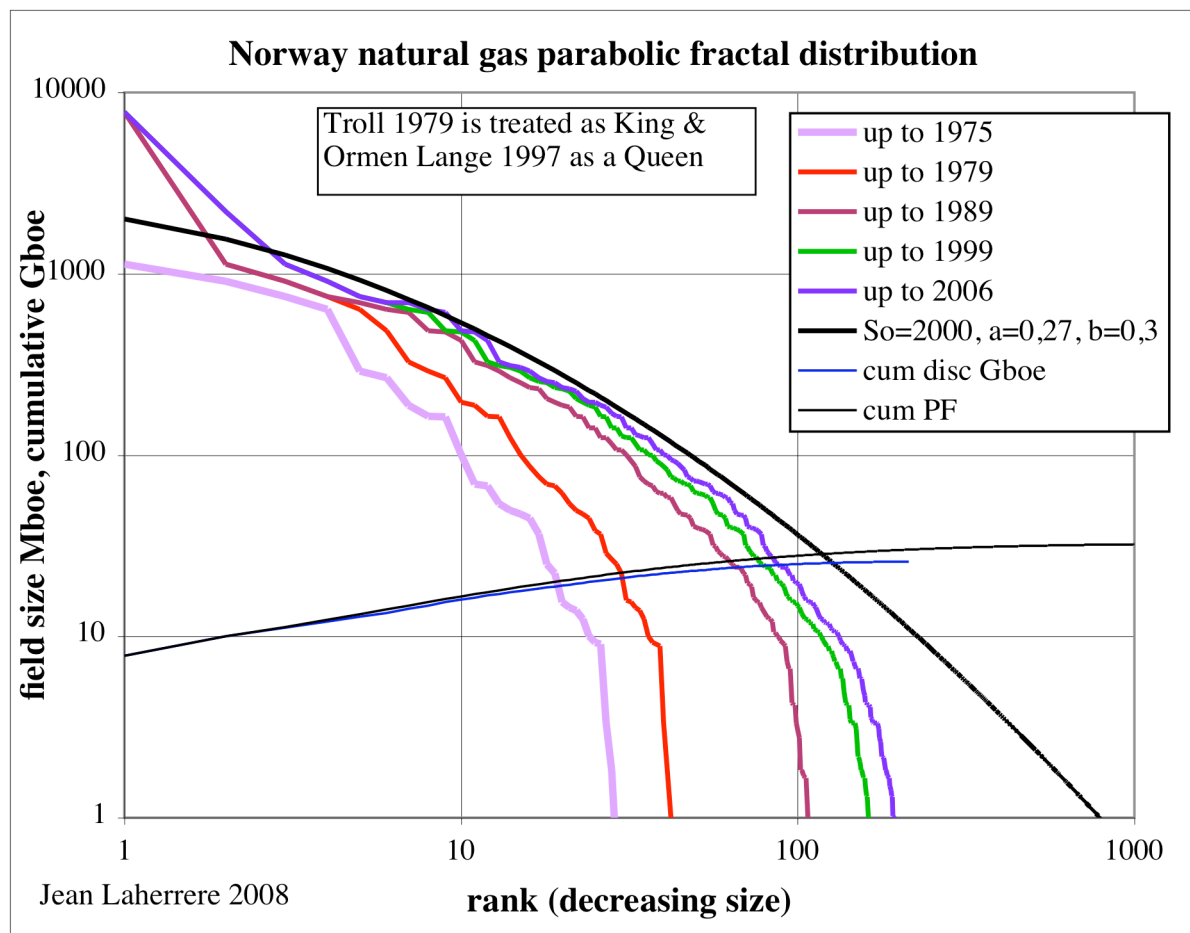


Little was found after 1999.

The cumulative discovery end 2006 is 33 Gb (215 fields of which 146 >10 Mb) when the cumulative PF for >10 Mb is 40 Gb for 227 fields

Natural gas

The fractal distribution for natural gas shows that Troll 1977 and Ormen Lange 1997 are King and Queen, disturbing the model which is taken excluding Troll and Ormen Lange as $S_o=2000$ Mboe, $a=0,27$, $b=0,3$ making a normal habitat



The addition of oil normal habitat and a normal habitat with King and Queen for gas leads to a concentrated habitat for oil and gas.

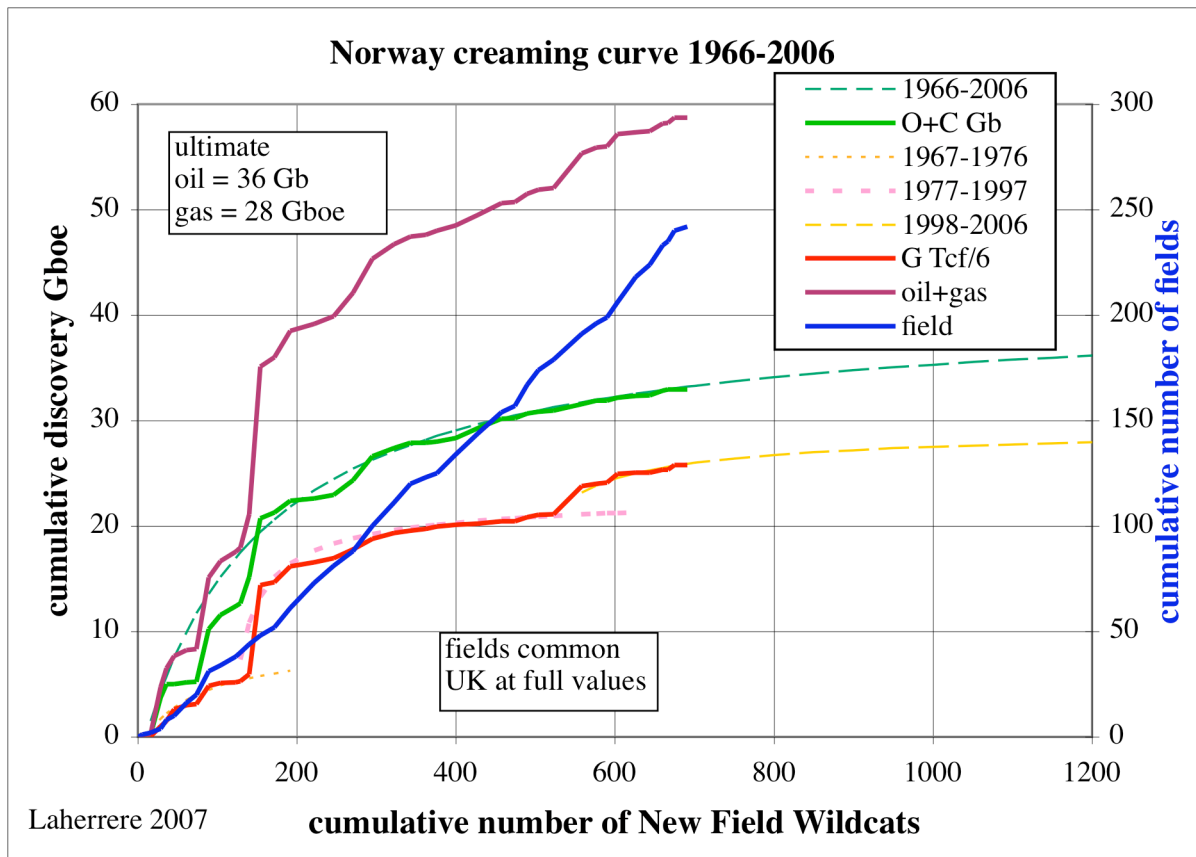
The cumulative discovery is 26 Gboe = 155 Tcf (214 fields of which 133 >10 Mboe) when the cumulative PF is 30 Gboe (180 Tcf) for 226 fields >10 Mboe

-Creaming curve

The creaming curve was estimated with the same fields (Common UK fields at full value)

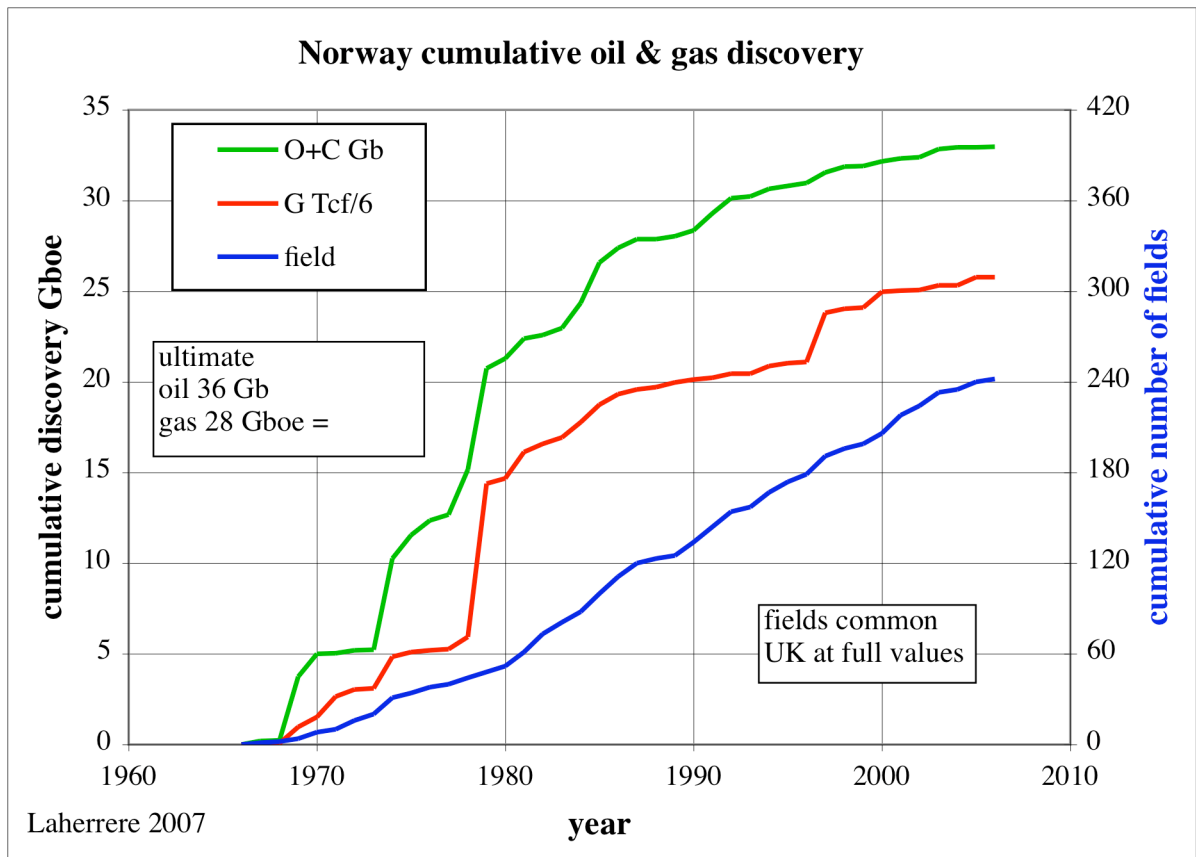
The cumulative number of fields versus the cumulative number of NFW is straight, meaning that there is still discoveries to be made but the flattening of the oil and gas curve shows that the yet to find will be of small size. The only problem with creaming curves is that there are several cycles in the past and it is necessary to guess if there will be new cycle. The last results in Barents sea are disappointing but because we deal with part of natural systems (Petroleum Systems) it is hard to guess. We assume that a new significant cycle is unlikely.

The creaming curve is also assumed to be stopped at the end of exploration for a cumulative number of NFW about 1200 (presently 700) before reaching the asymptote which corresponds to an infinite number of NFW.



The ultimate is then estimated at 36 Gb for oil and 28 Gboe for gas, which is in agreement with the parabolic fractal evaluation.

The cumulative discovery versus time is slightly different and less easy to extrapolate.



In conclusion creaming curve seems better to estimate ultimates but parabolic fractal indicates the type of habitat.

Parabolic fractal should be apply more on Petroleum Systems than on country boundaries.