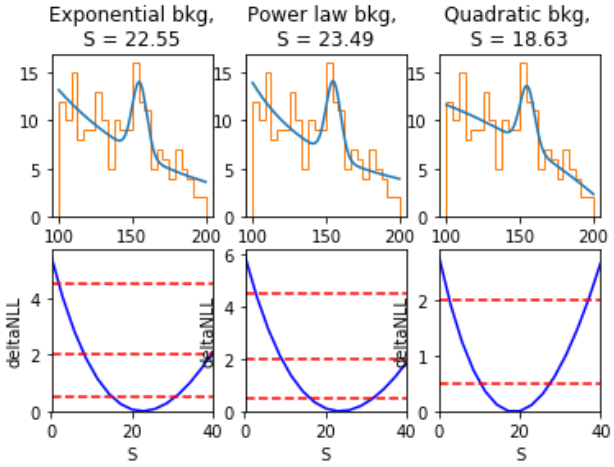
In [2]:
```
# the cursed way of exec python codes
import warnings
warnings.filterwarnings("ignore")
exec(open("./exer1.py").read())
```

```
Minimization # 2 started.
Minimization # 3 started.
Minimization # 1 started.
Minimization # 1 finished, best S = 22.55142489135046
Minimization # 2 finished, best S = 23.494303201823072
Minimization # 3 finished, best S = 18.63733971050735
```



Report

For this sig/bkg distribution, we picked three distribution for background: exponential decay, power law, and a qudradic. For these three backgrounds, we get best estimated S of 22,5, 23,5, 18.6, respectively. Check out the above figures for a bkg+sig overlap.

To my best judgement, power law and exponential decay backgrounds are responable, since larger invariant mass corresponds to smaller production xsec.

As we can see, whatever fit we choose, *S = 0* is very unlikely and in *exponential* fit and *power law*, we see we have a `sigma > 3` evidence of signal process!

Among these fits, we see eponential and power law are the better ones(in terms of excluding S = 0), of course, they are more physical than quadratic to begin with...

Quoting what we see in power law decay, S = 24 ± 4, as for ZZ, comapreing across model, let's say S = 24 ± 4 ± 5