

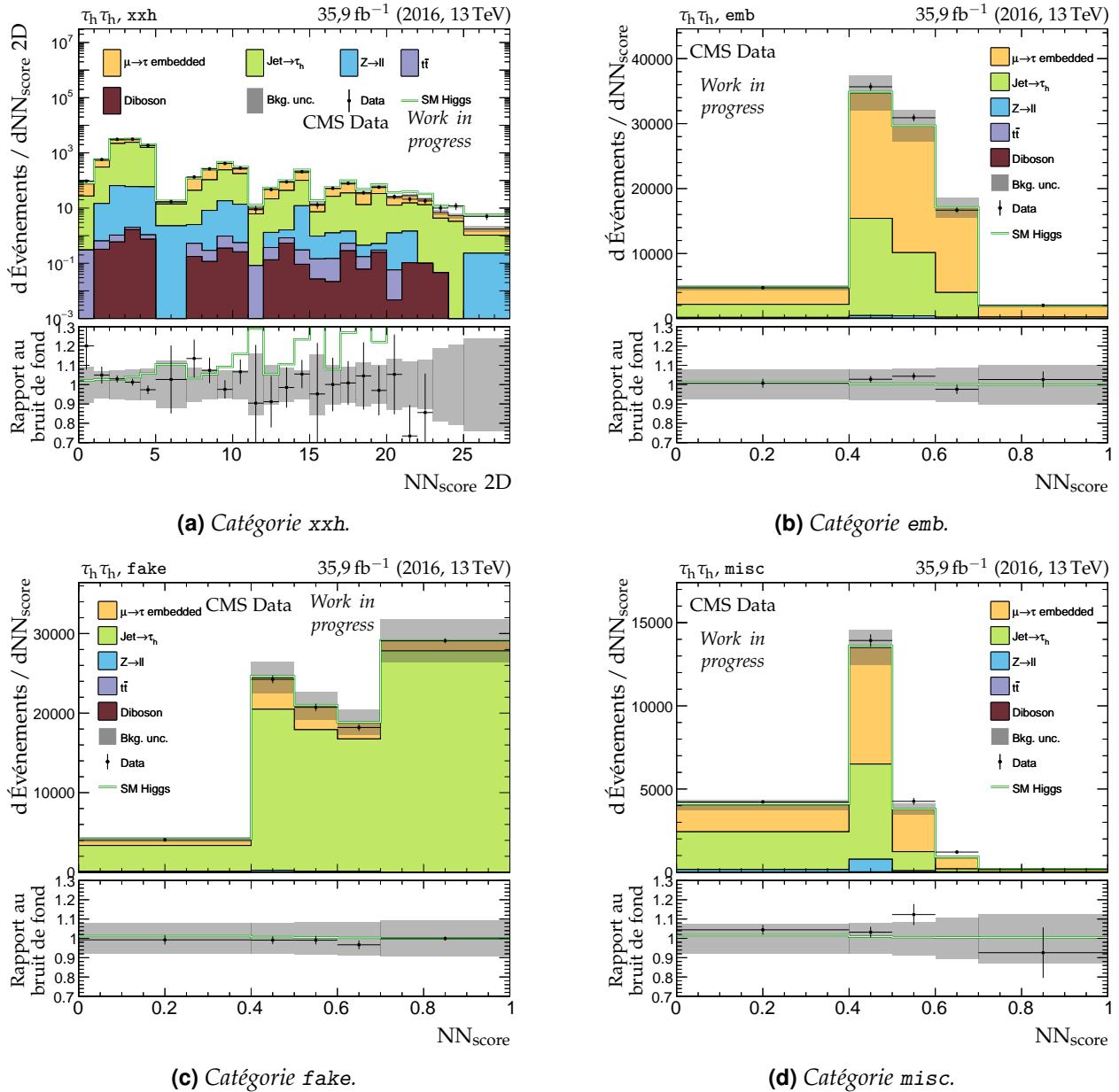
Annexe X

Distributions des variables discriminantes – $H \rightarrow \tau\tau$

Cette annexe présente des distributions des variables discriminantes sur les événements utilisés dans l'analyse des événements $H \rightarrow \tau\tau$ présentée dans le chapitre 4.

Pour chacune des trois années de prise de données (2016, 2017, 2018), chacun des quatre canaux ($\tau_h\tau_h$, $\mu\tau_h$, $e\tau_h$, $e\mu$) et chacune des catégories définies au chapitre 4, la distribution de la variable discriminante associée est donnée.

2 ANNEXE X. DISTRIBUTIONS DES VARIABLES DISCRIMINANTES – $H \rightarrow \tau\tau$



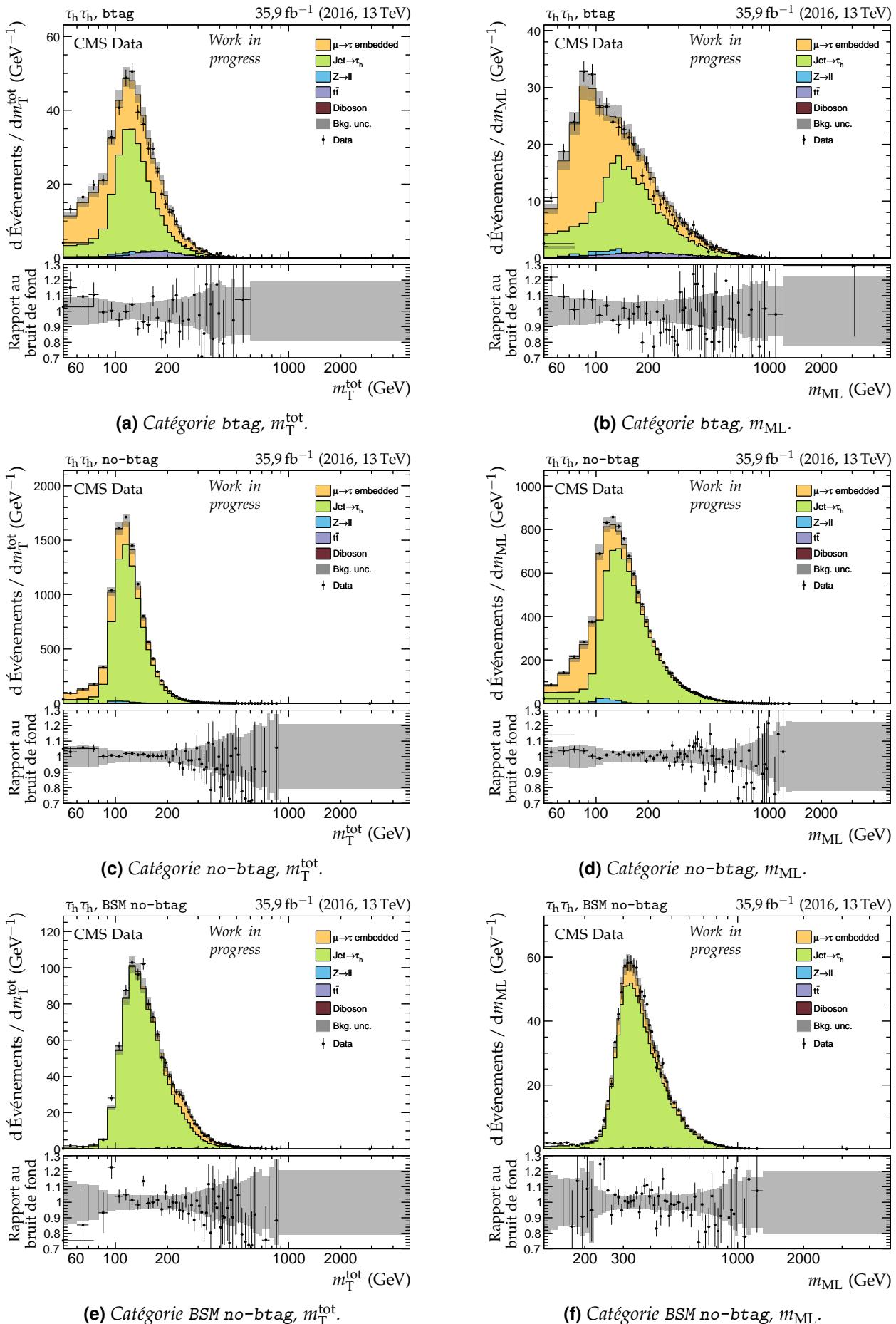


Figure X.2 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $\tau_h \tau_h$.

4 ANNEXE X. DISTRIBUTIONS DES VARIABLES DISCRIMINANTES – $H \rightarrow \tau\tau$

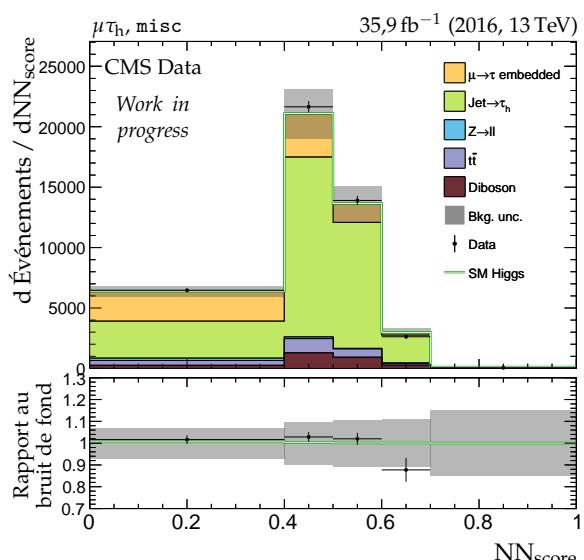
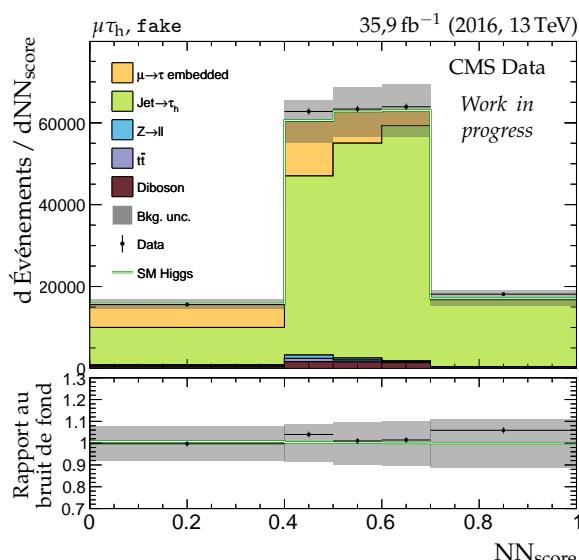
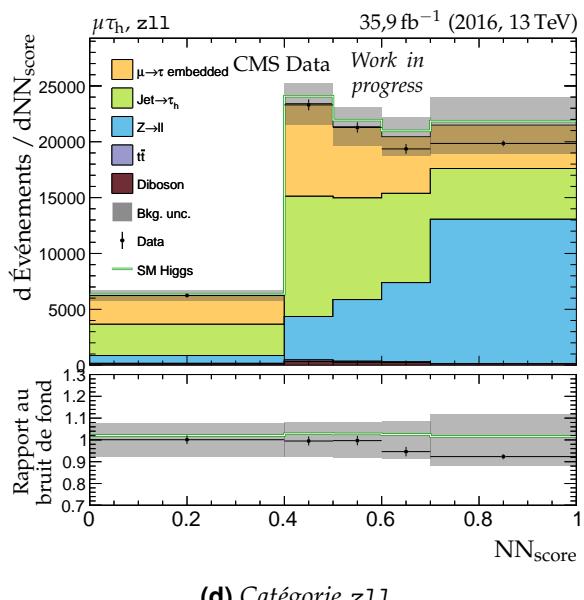
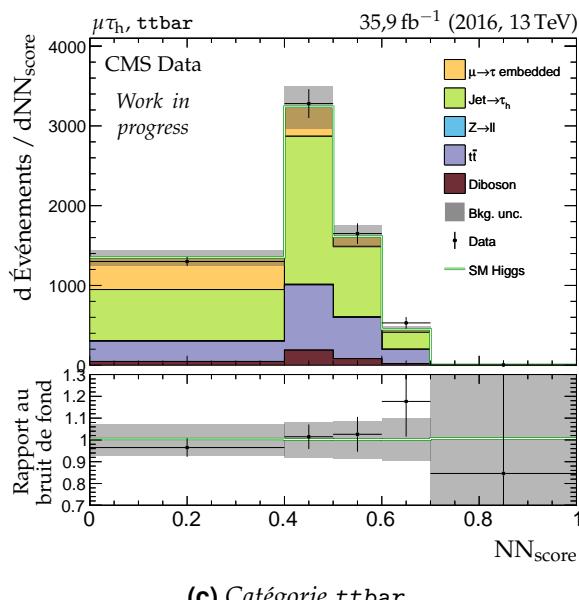
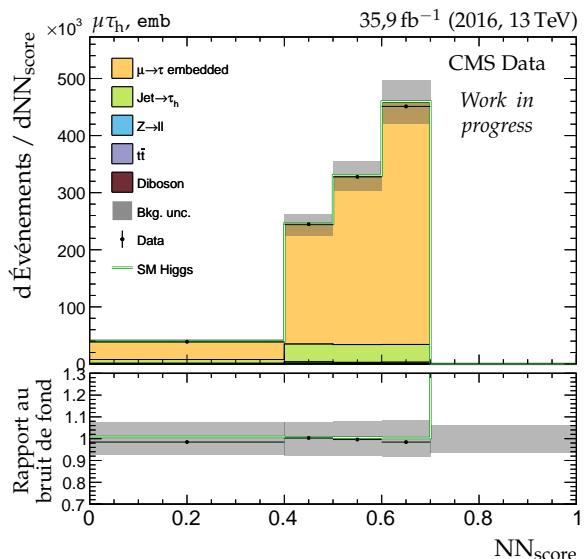
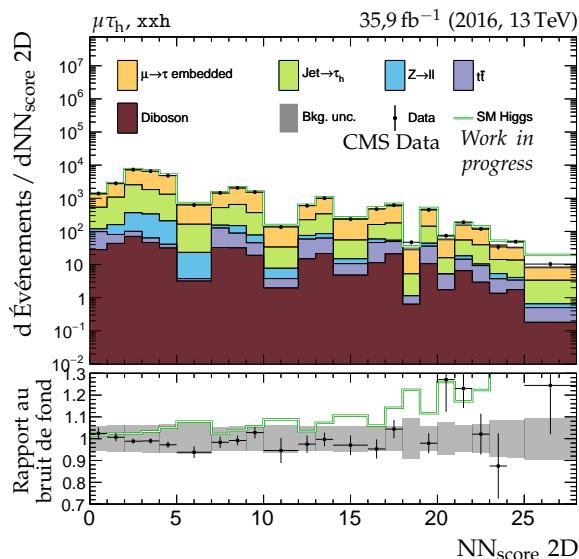


Figure X.3 – Distributions de NN_{score} en 2016 dans le canal $\mu\tau_h$.

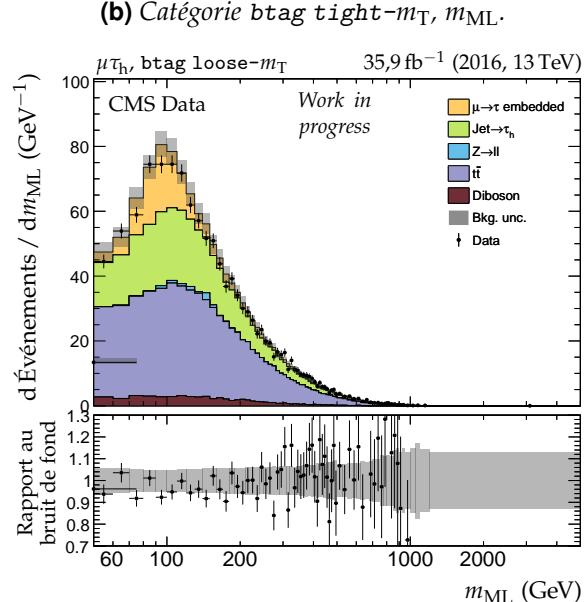
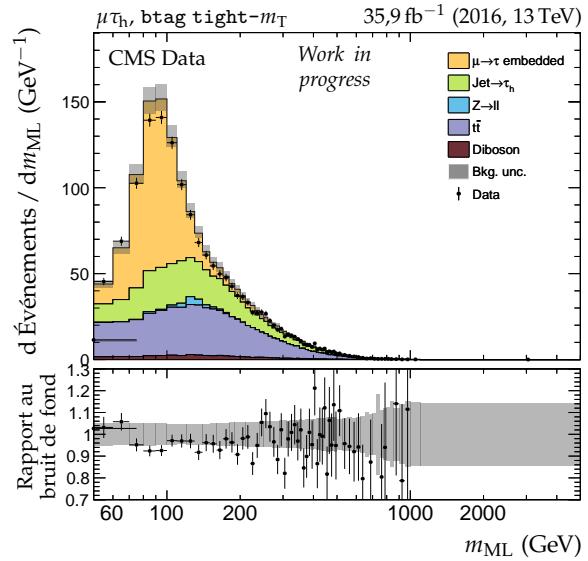
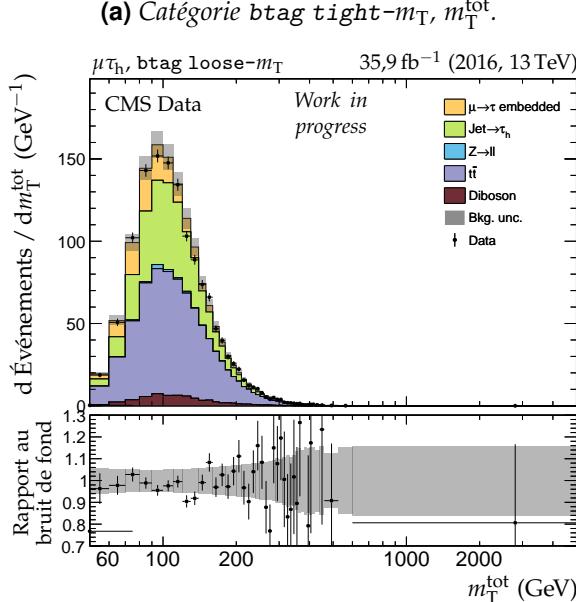
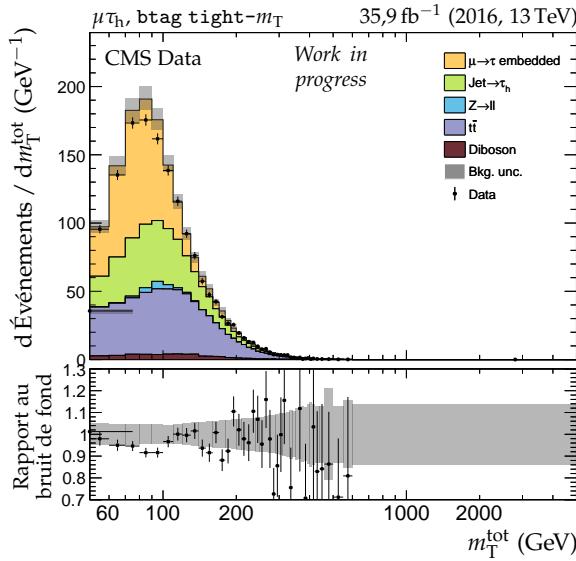


Figure X.4 – Distributions de $m_{\text{T}}^{\text{tot}}$ et m_{ML} en 2016 dans le canal $\mu\tau_h$, catégories $b\text{tag}$.

6 ANNEXE X. DISTRIBUTIONS DES VARIABLES DISCRIMINANTES – $H \rightarrow \tau\tau$

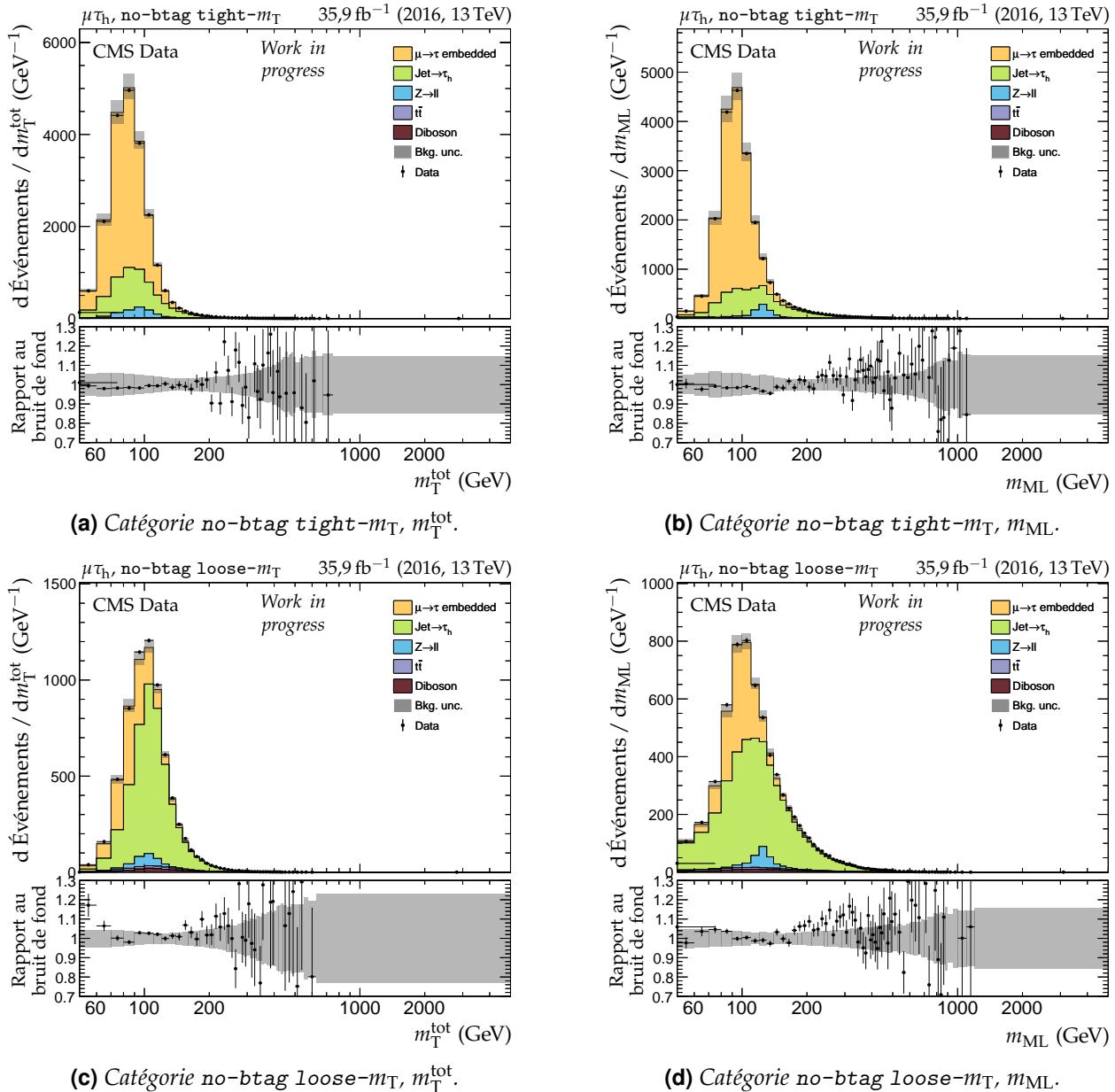


Figure X.5 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $\mu\tau_h$, catégories no-btag.

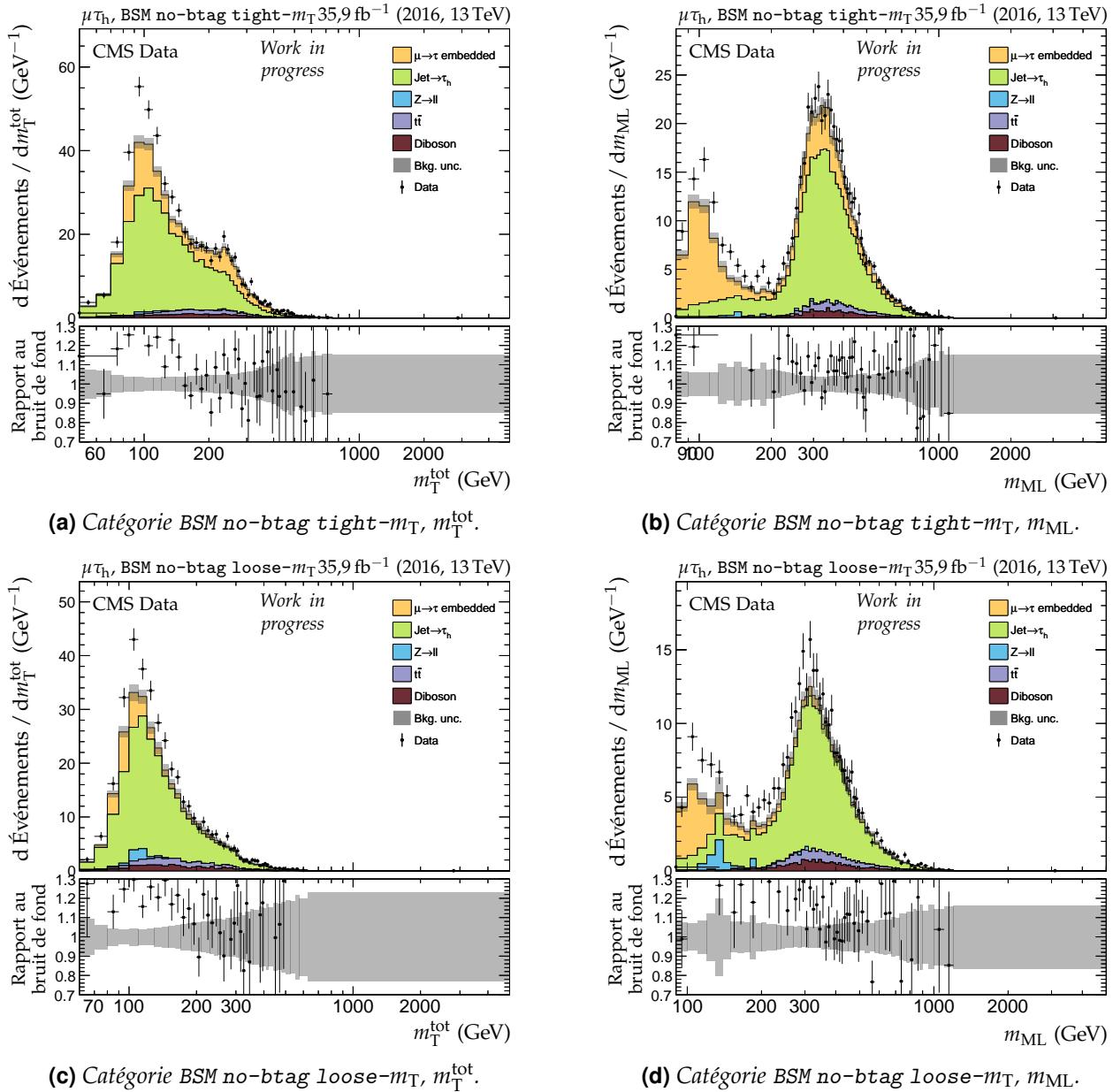
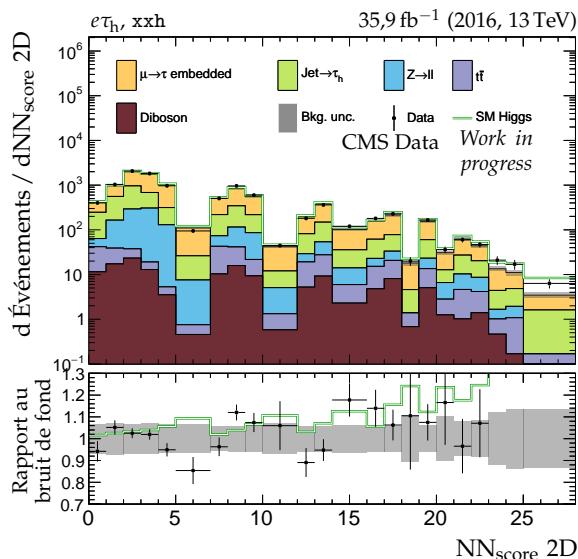
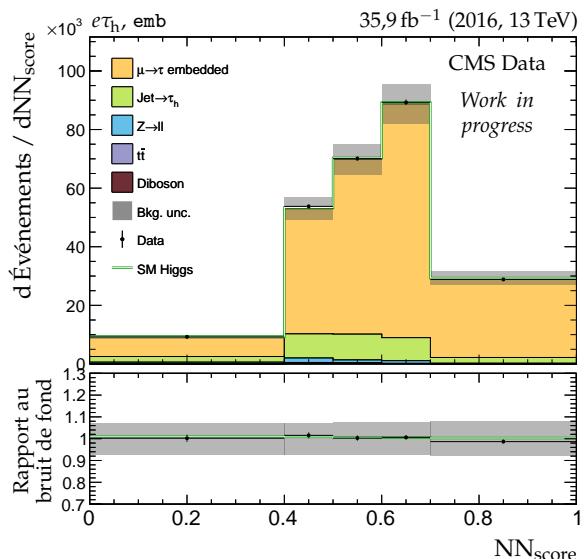


Figure X.6 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $\mu\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.

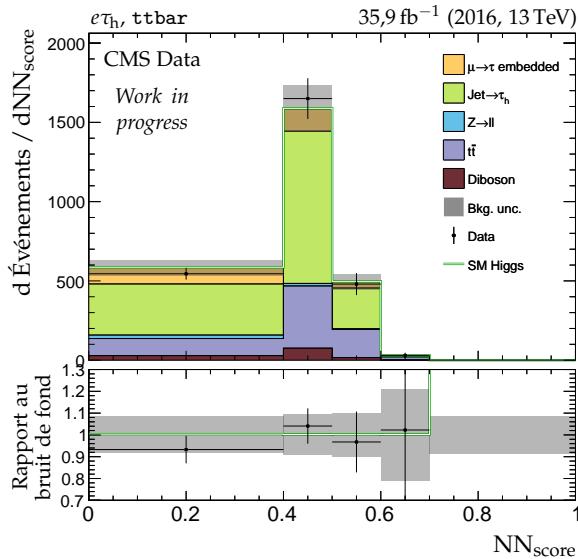
8 ANNEXE X. DISTRIBUTIONS DES VARIABLES DISCRIMINANTES – $H \rightarrow \tau\tau$



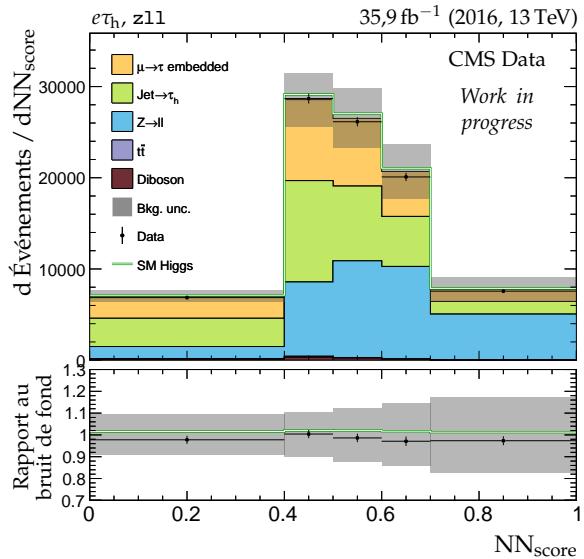
(a) Catégorie xxh .



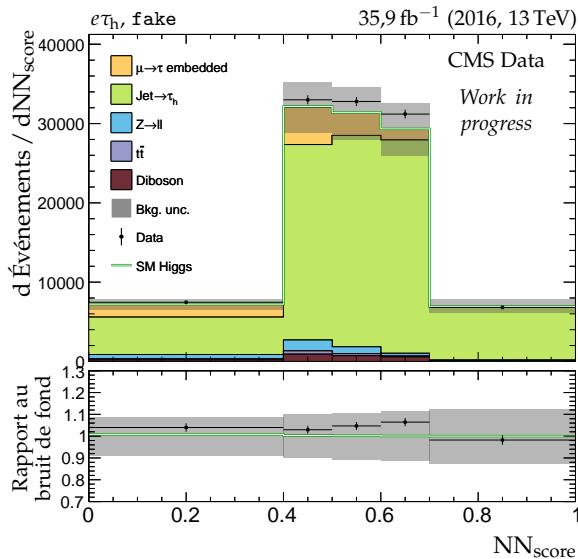
(b) Catégorie emb .



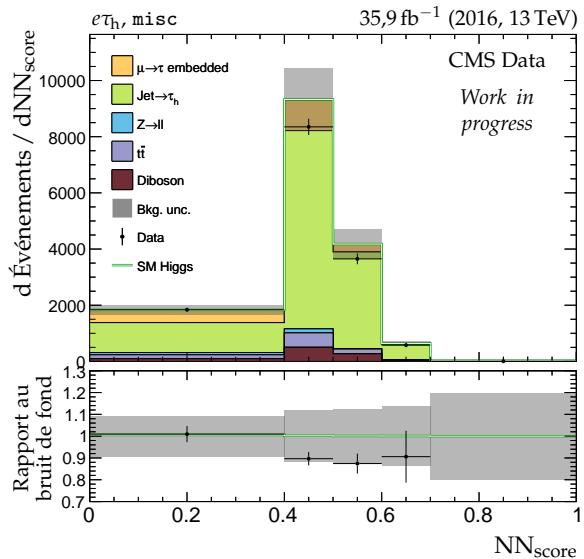
(c) Catégorie $ttbar$.



(d) Catégorie zll .

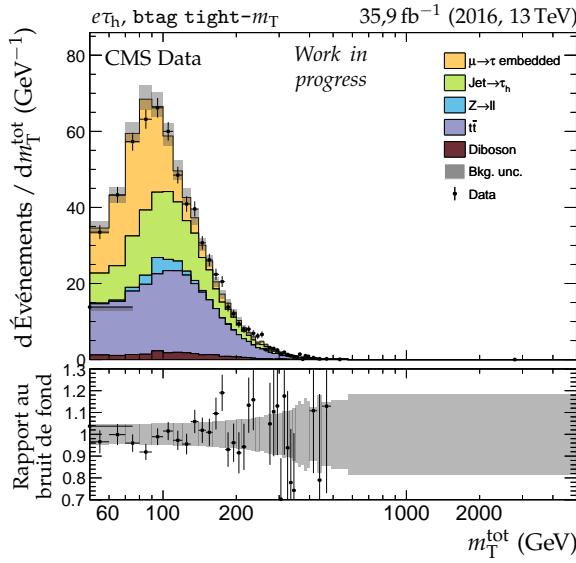


(e) Catégorie $fake$.

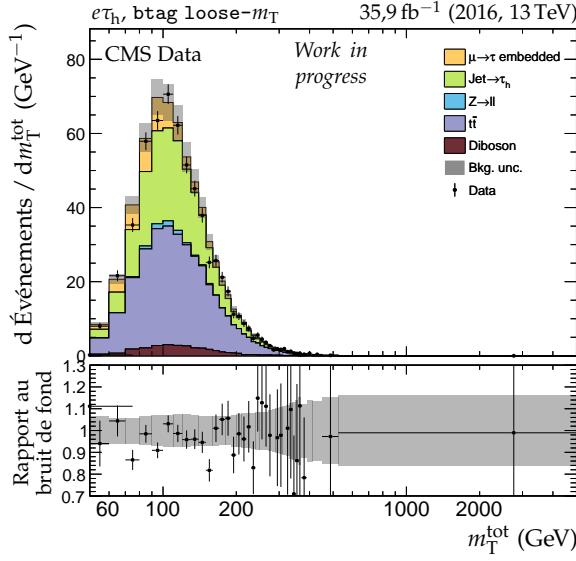


(f) Catégorie $misc$.

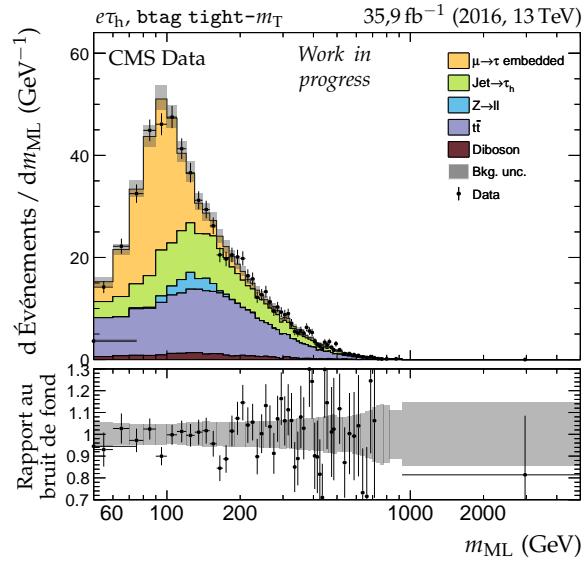
Figure X.7 – Distributions de NN_{score} en 2016 dans le canal $e\tau_h$.



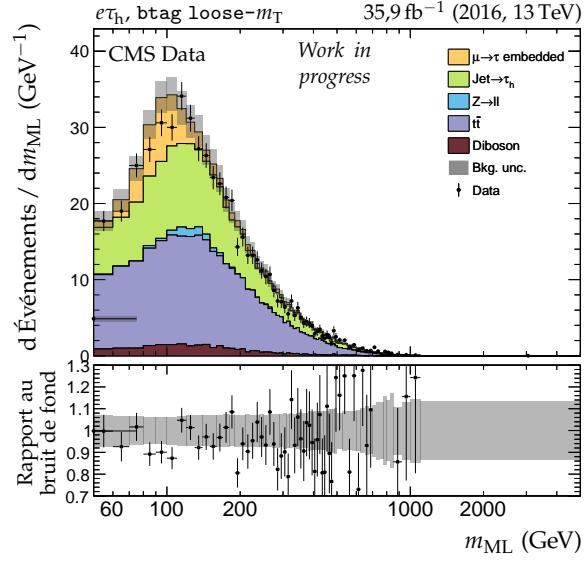
(a) Catégorie btag tight- m_T , m_T^{tot} .



(c) Catégorie btag loose- m_T , m_T^{tot} .

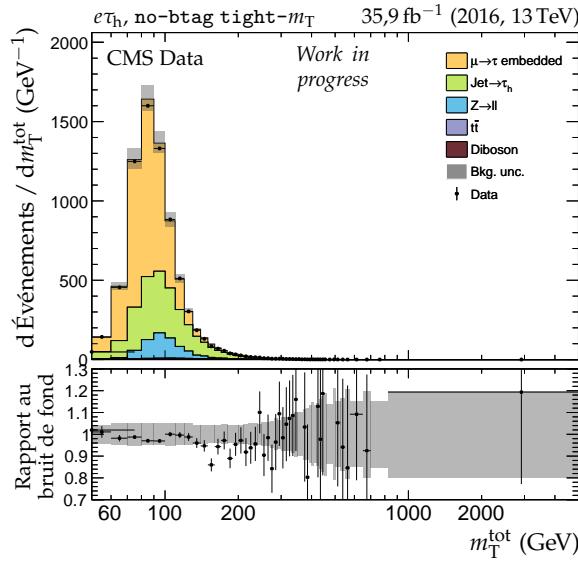


(b) Catégorie btag tight- m_T , m_{ML} .

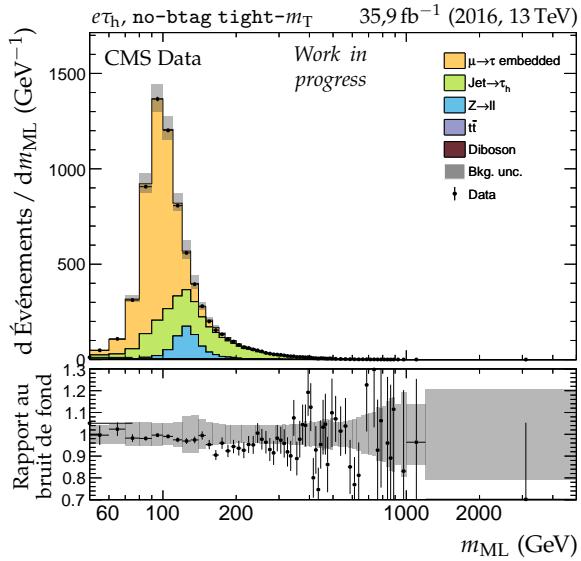


(d) Catégorie btag loose- m_T , m_{ML} .

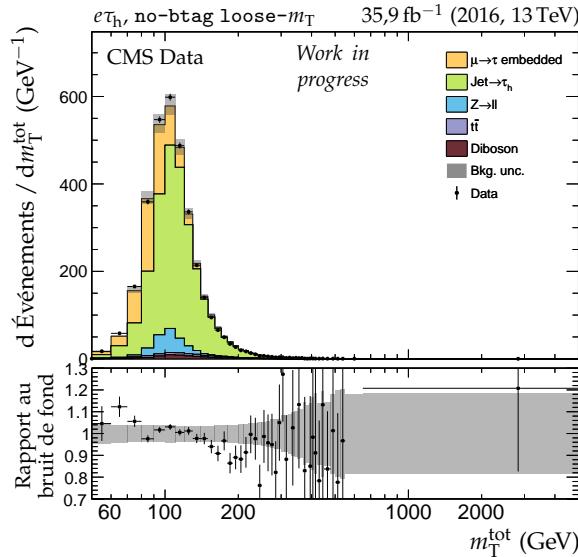
Figure X.8 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\tau_h$, catégories btag.



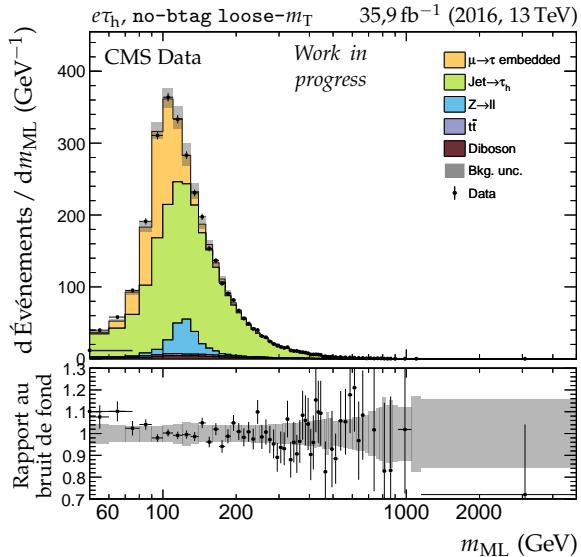
(a) Catégorie no-btag tight- m_T , m_T^{tot} .



(b) Catégorie no-btag tight- m_T , m_{ML} .



(c) Catégorie no-btag loose- m_T , m_T^{tot} .



(d) Catégorie no-btag loose- m_T , m_{ML} .

Figure X.9 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\tau_h$, catégories no-btag.

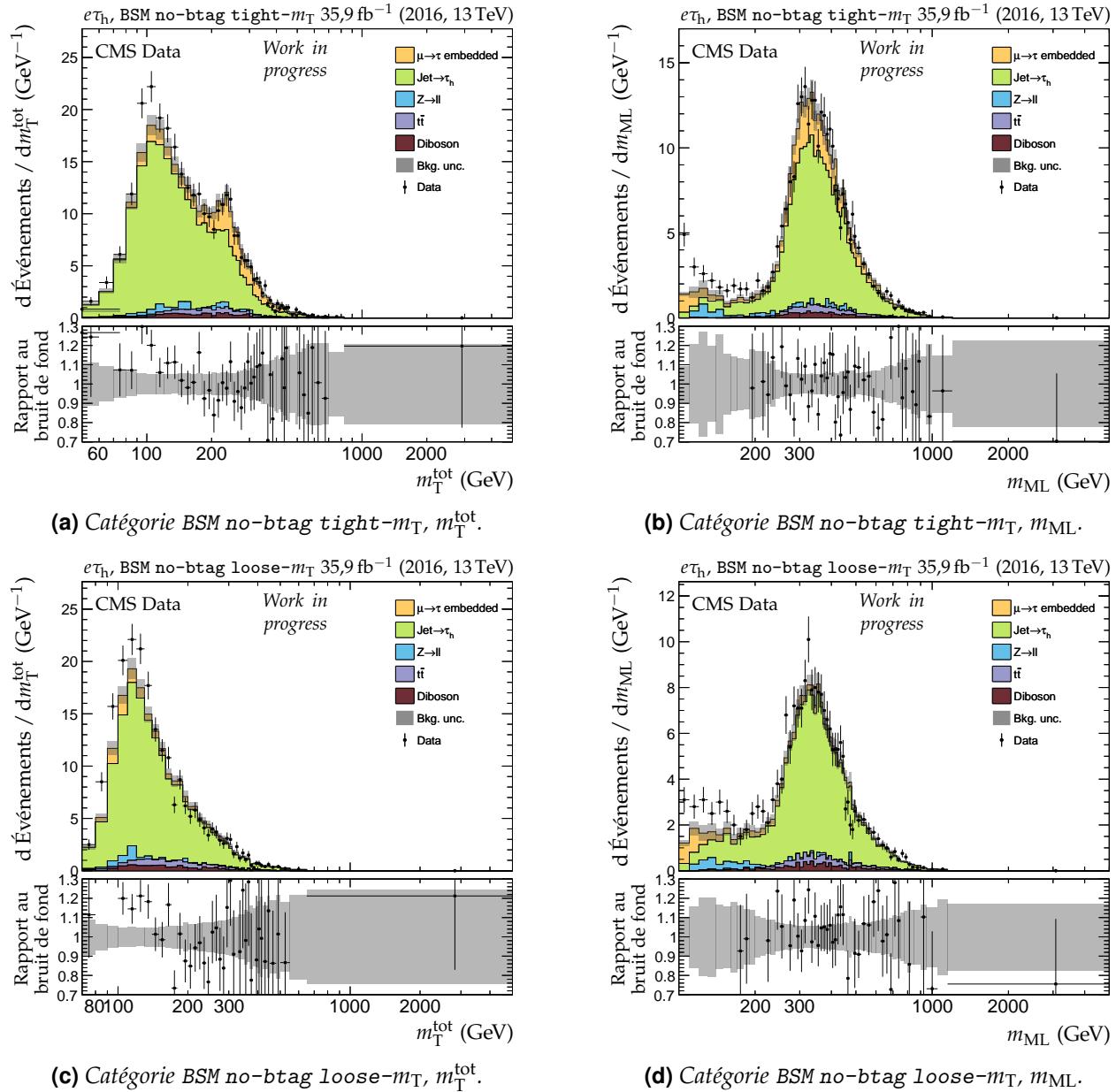


Figure X.10 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.

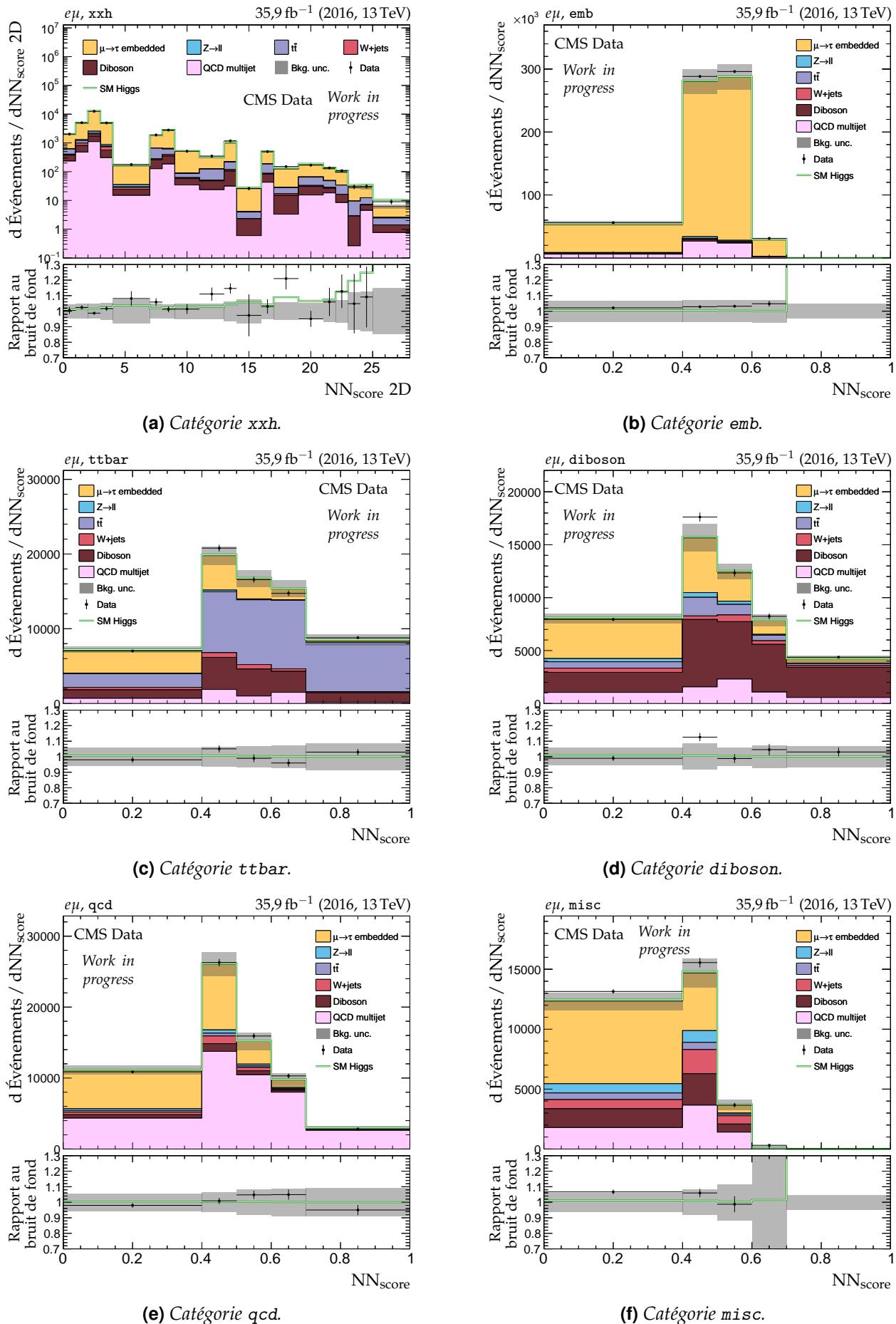


Figure X.11 – Distributions de NN_{score} en 2016 dans le canal $e\mu$.

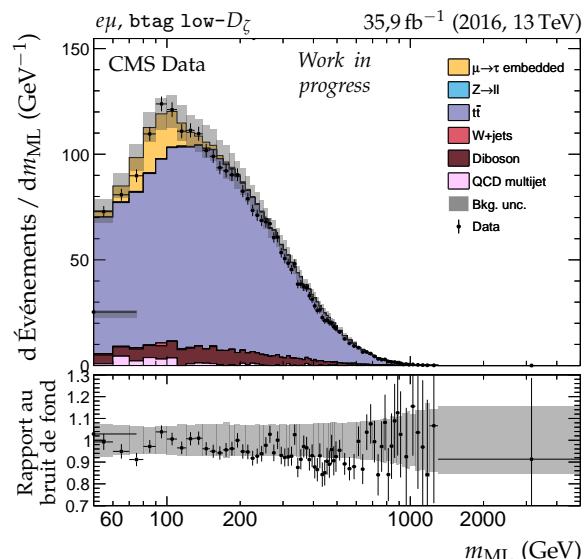
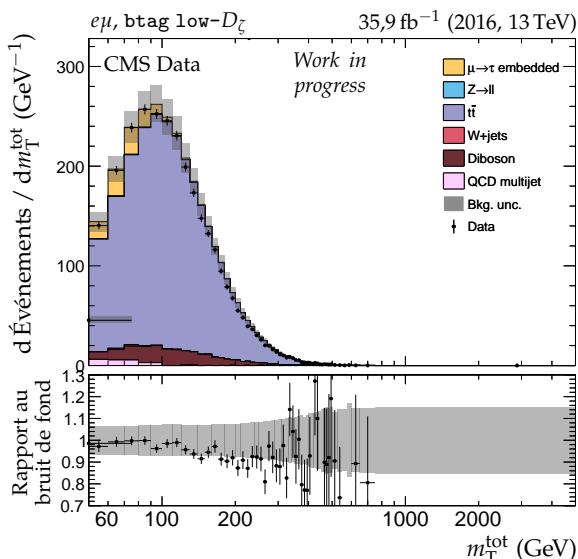
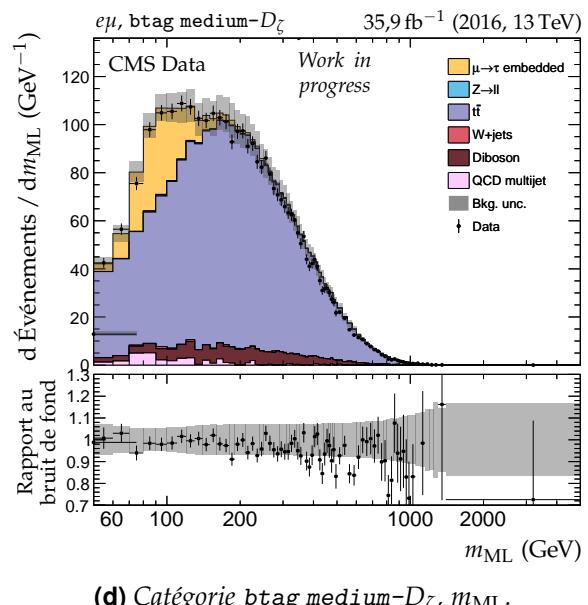
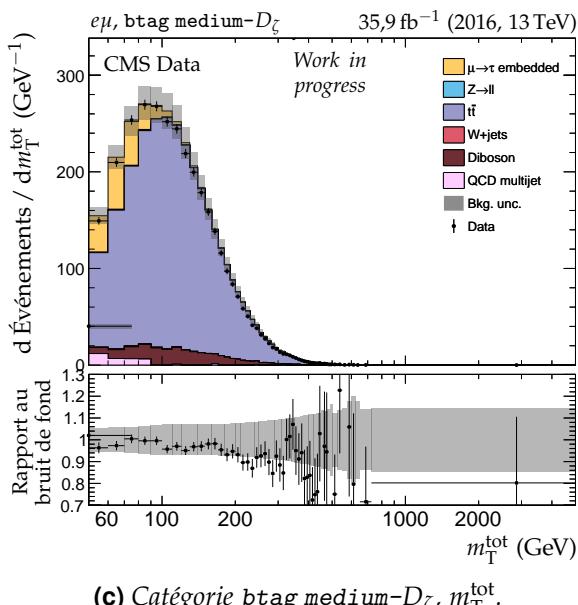
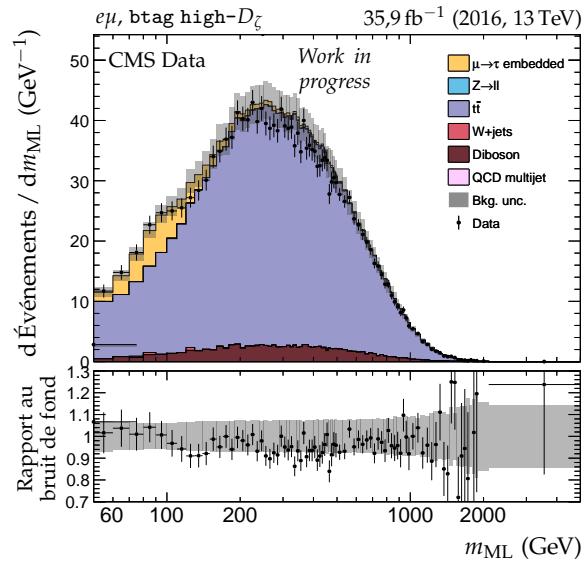
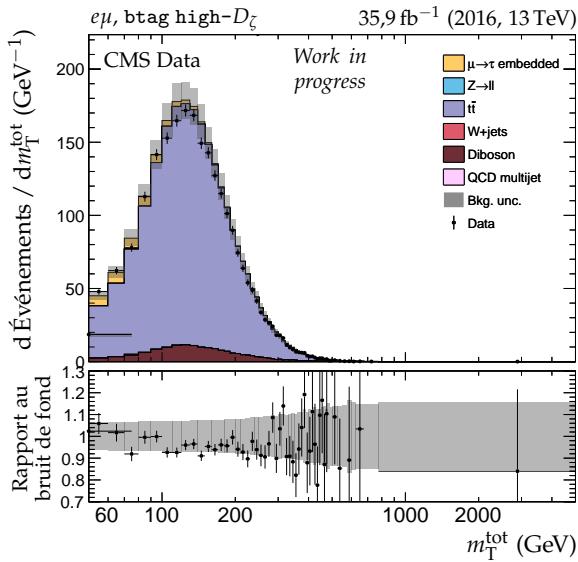


Figure X.12 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\mu$, catégories $b\text{tag}$.

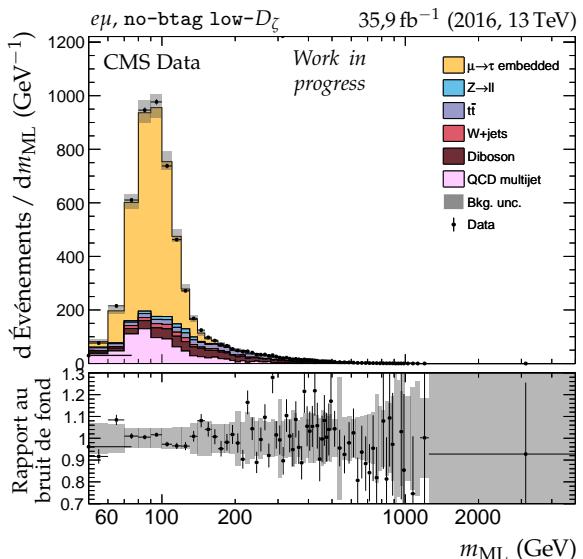
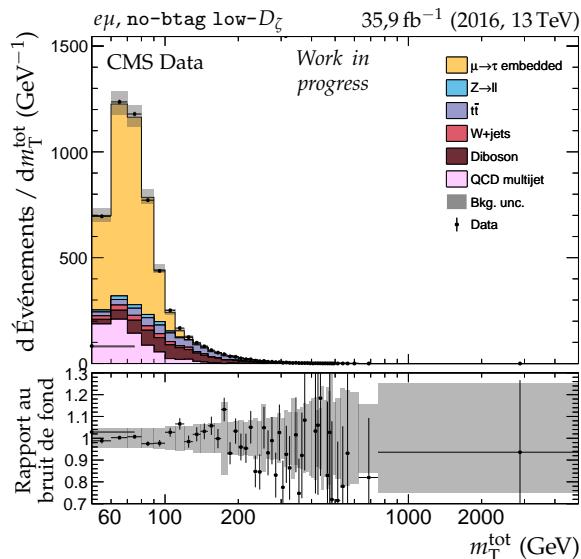
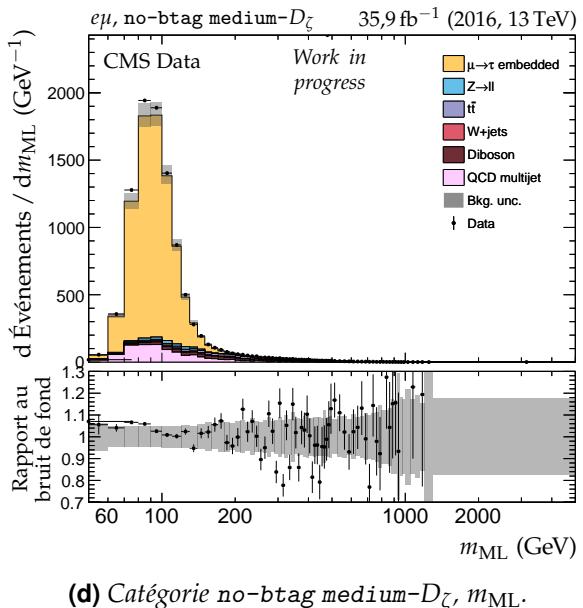
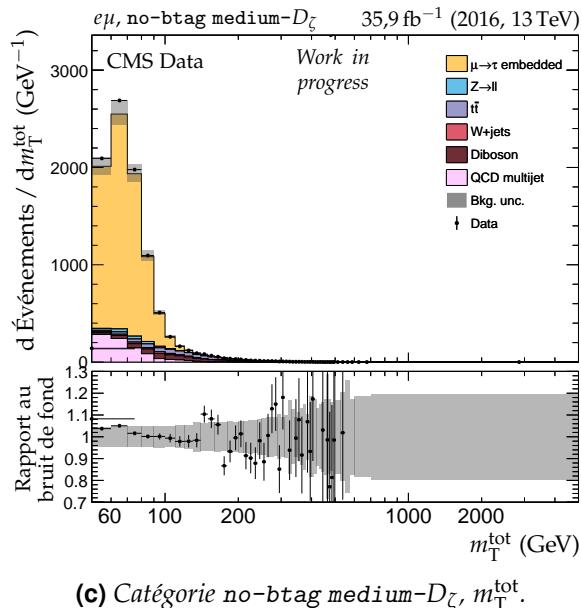
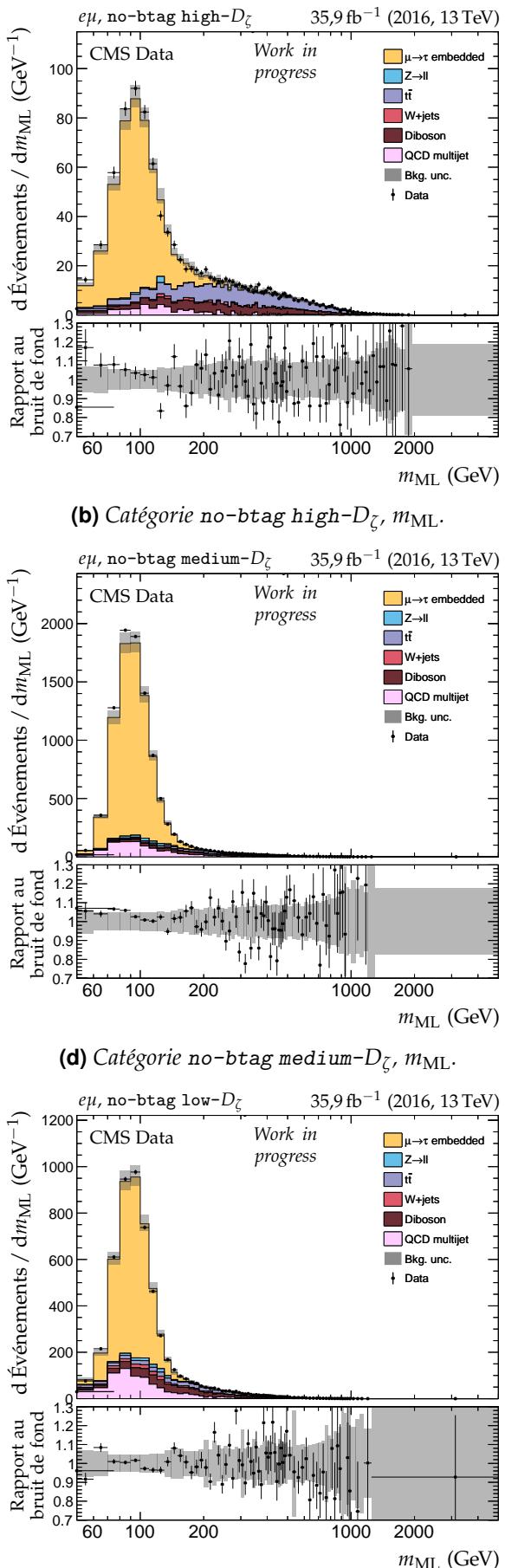
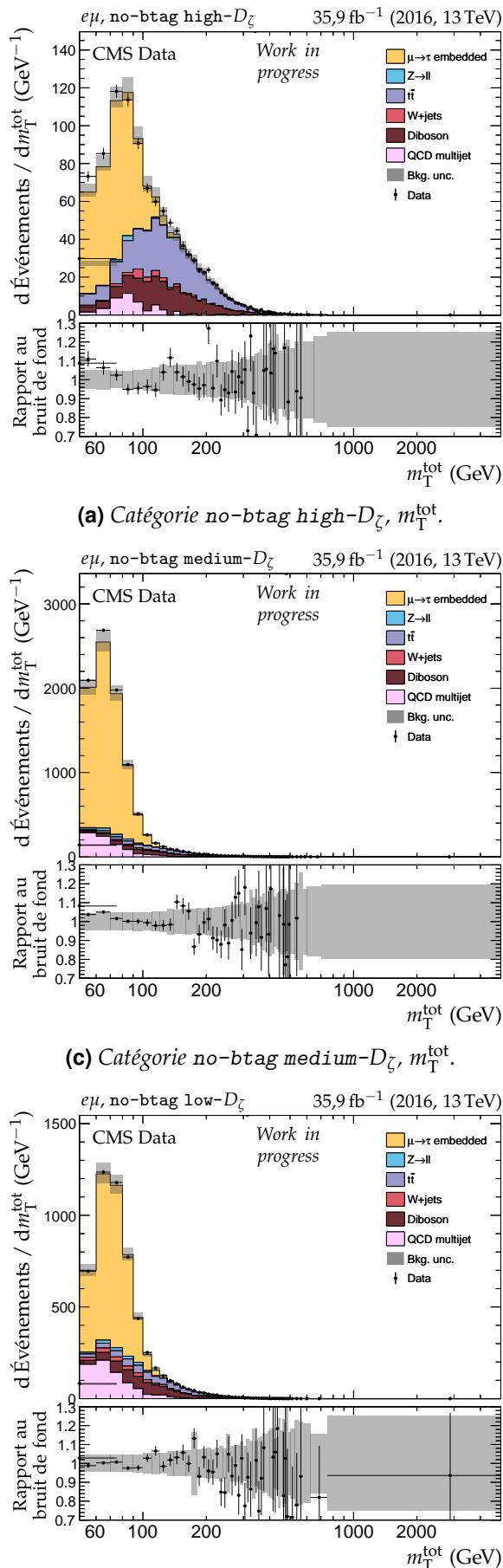


Figure X.13 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\mu$, catégories no-btag.

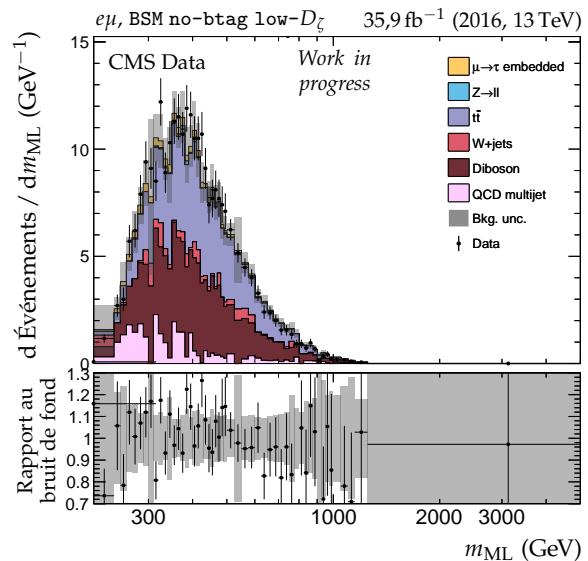
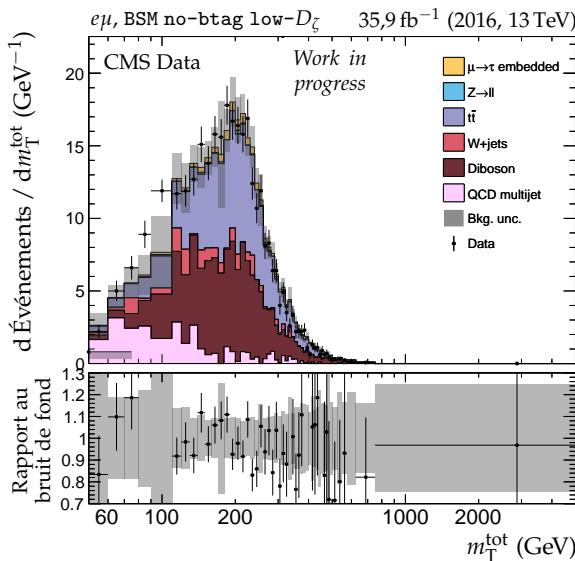
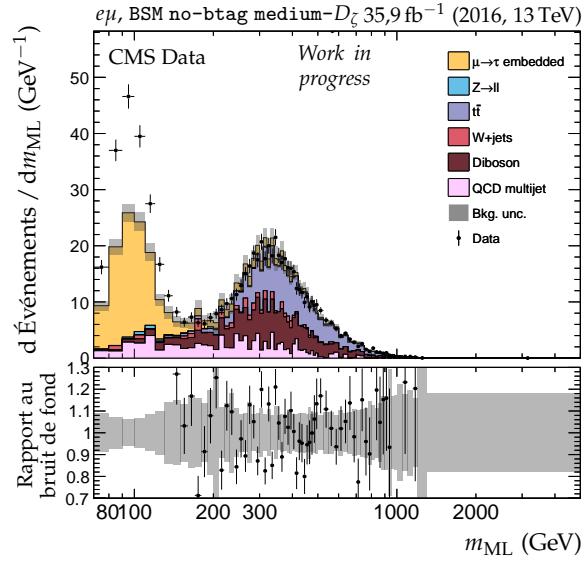
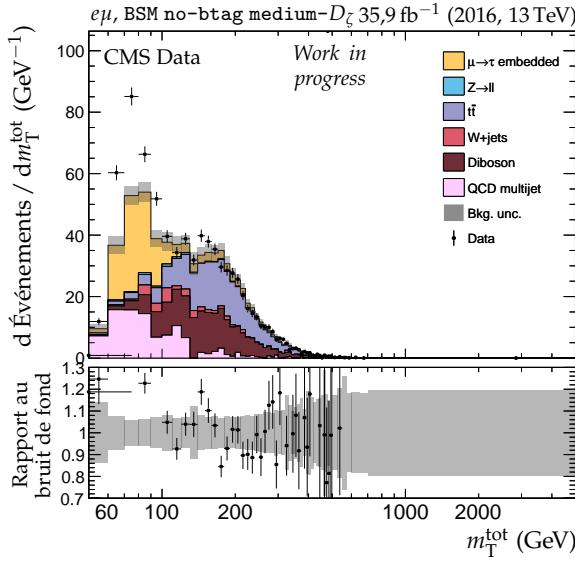
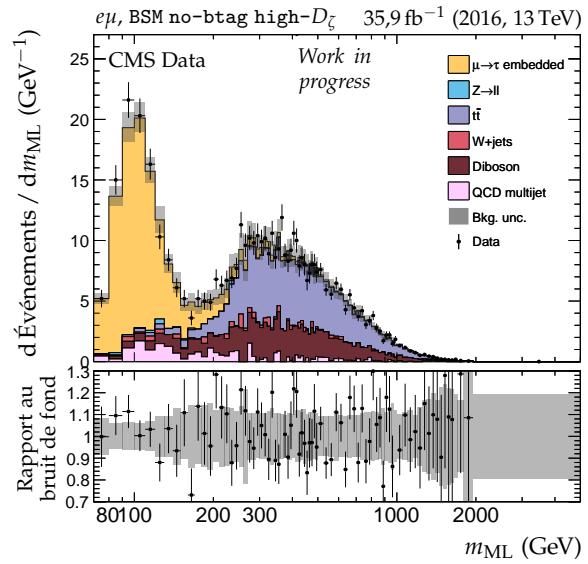
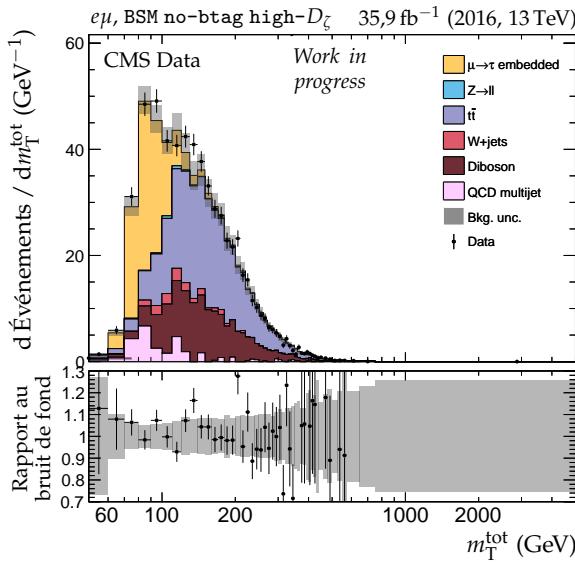
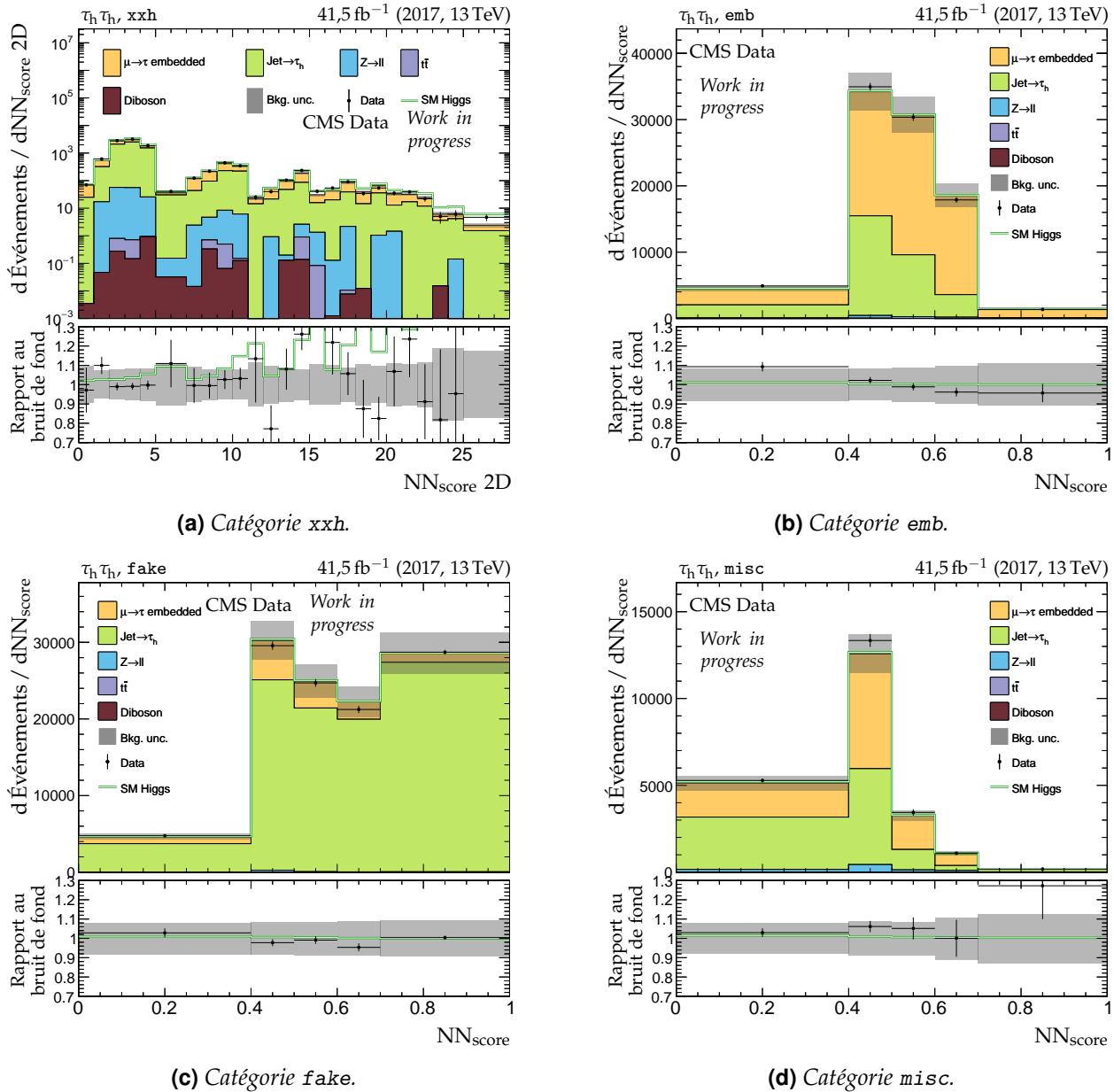
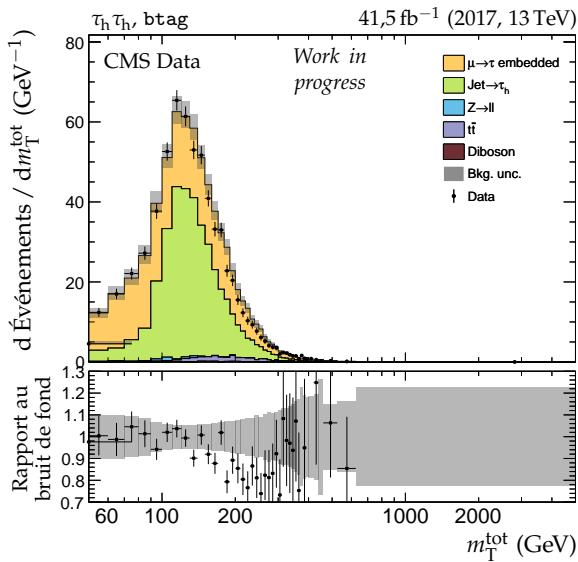
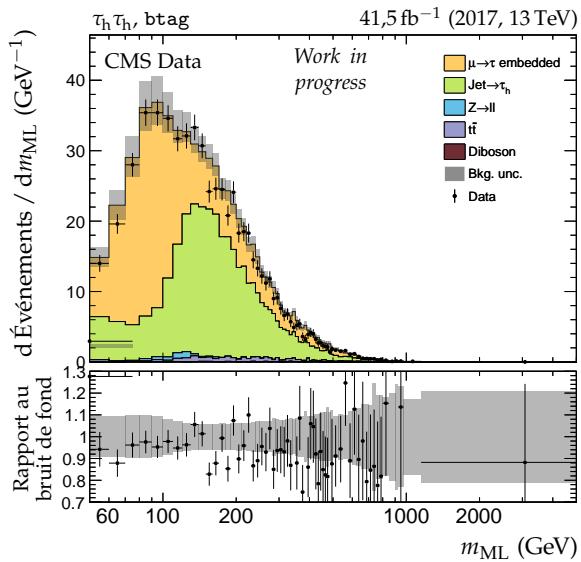
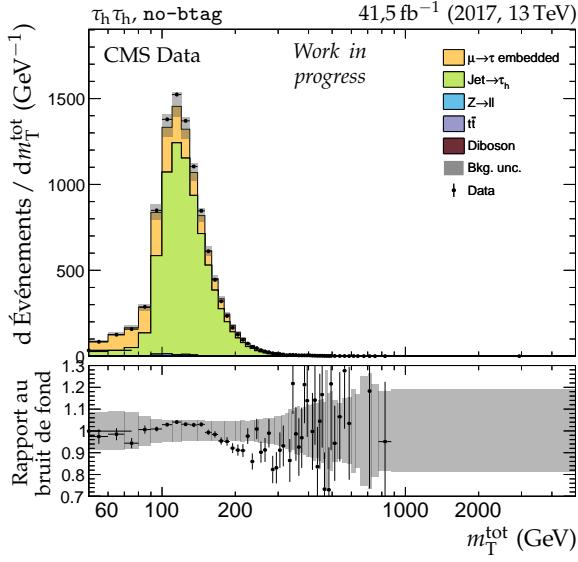
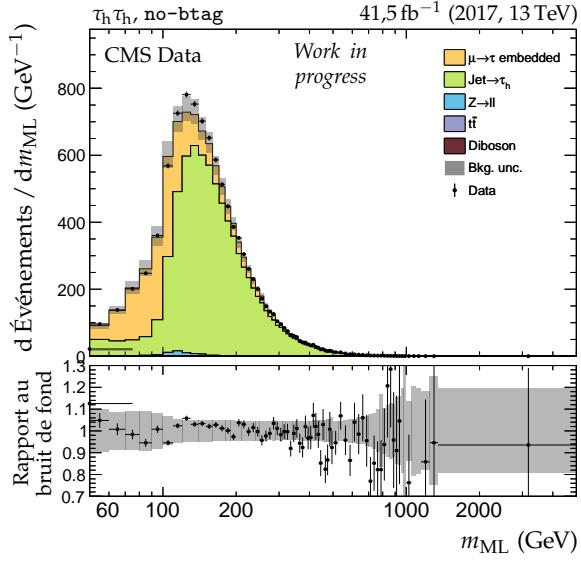
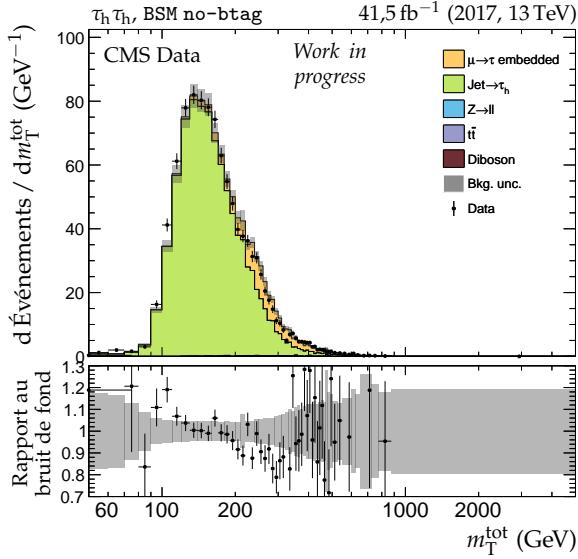
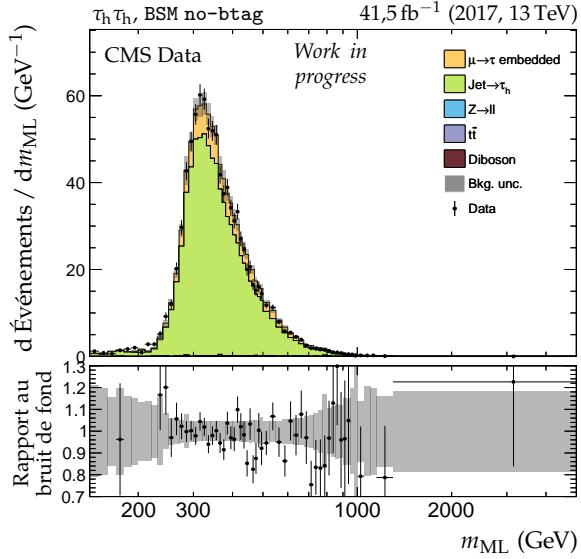
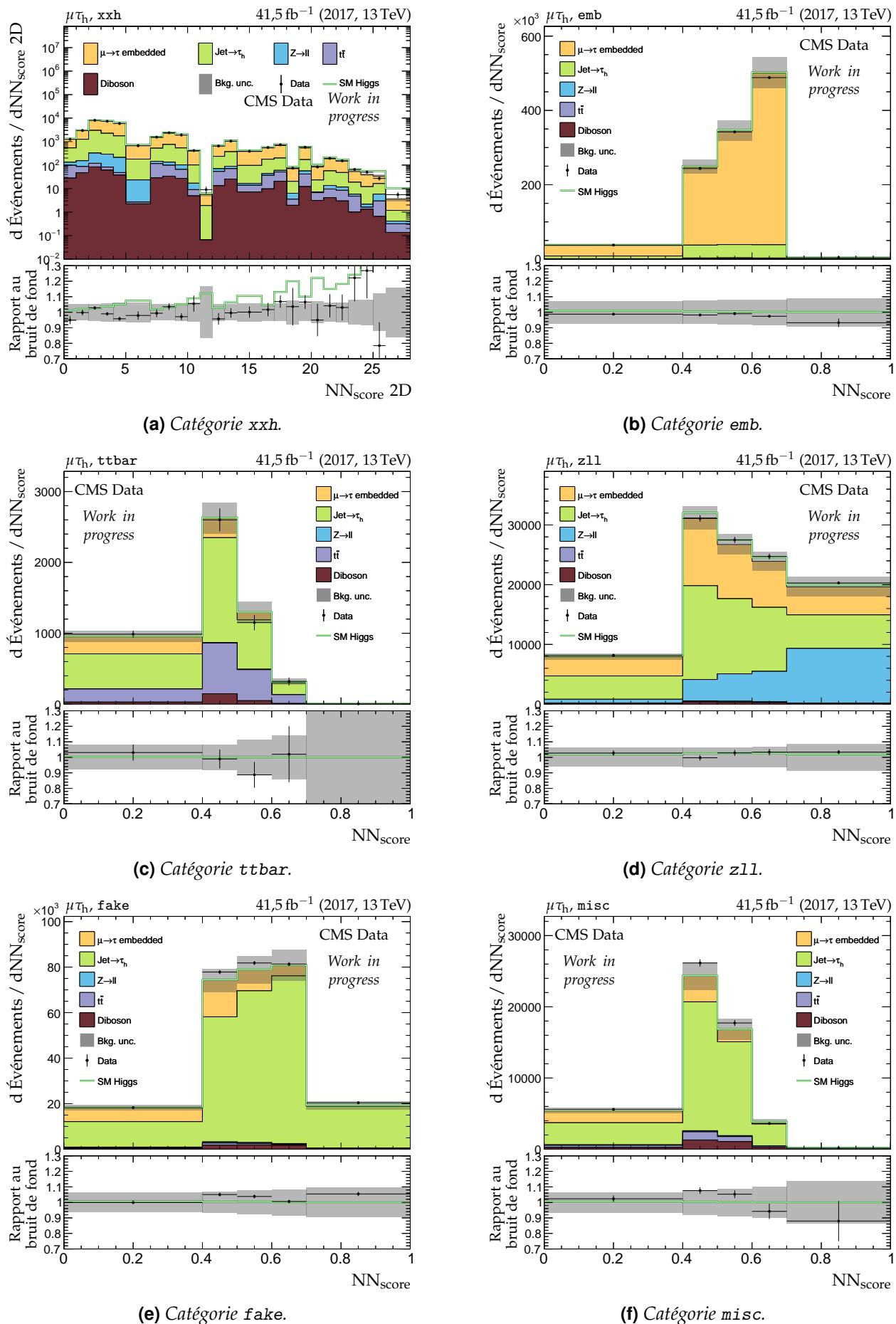


Figure X.14 – Distributions de m_T^{tot} et m_{ML} en 2016 dans le canal $e\mu$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.



(a) Catégorie btag, m_T^{tot} .(b) Catégorie btag, m_{ML} .(c) Catégorie no-btag, m_T^{tot} .(d) Catégorie no-btag, m_{ML} .(e) Catégorie BSM no-btag, m_T^{tot} .(f) Catégorie BSM no-btag, m_{ML} .**Figure X.16** – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $\tau_h \tau_h$.



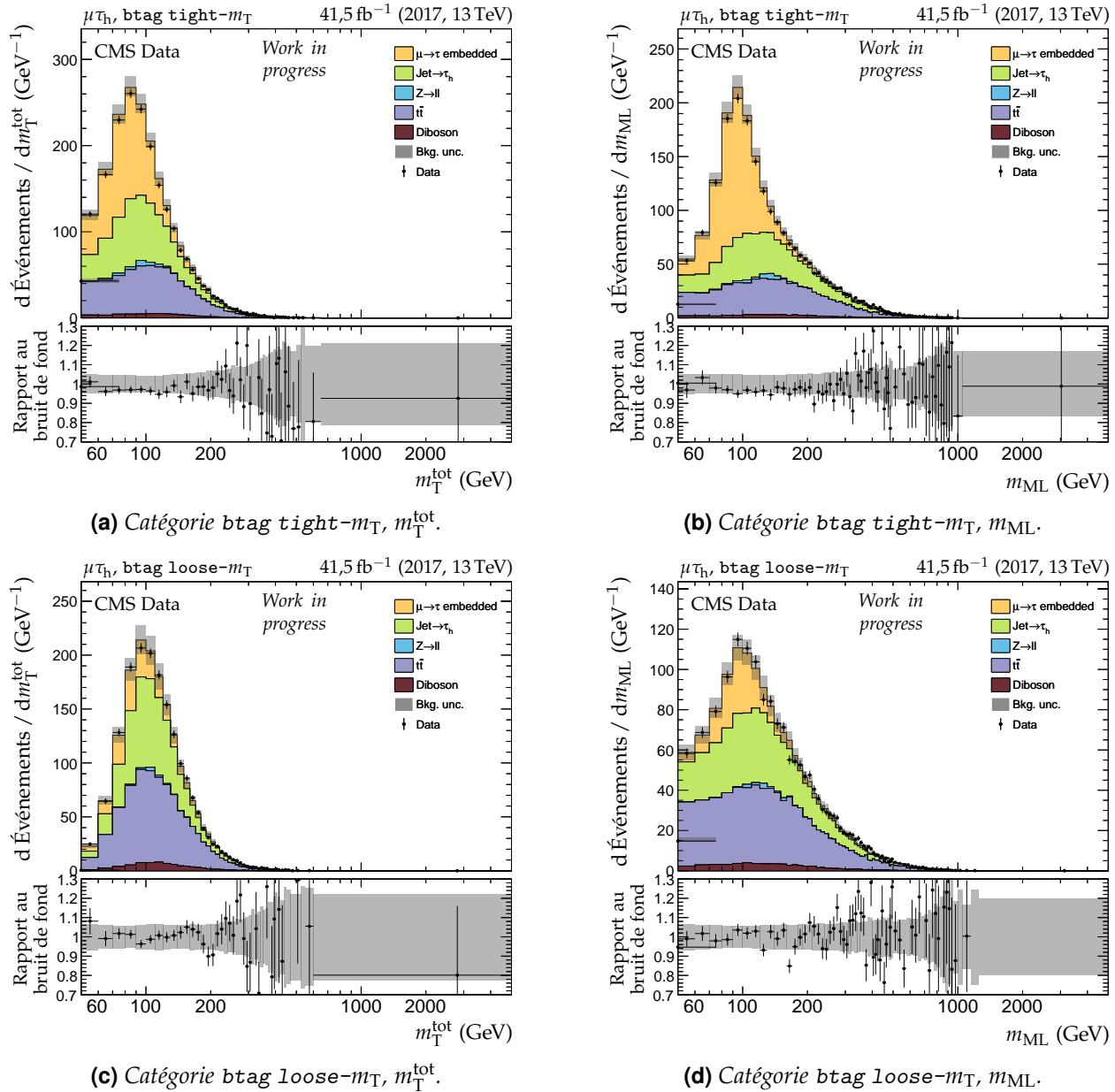
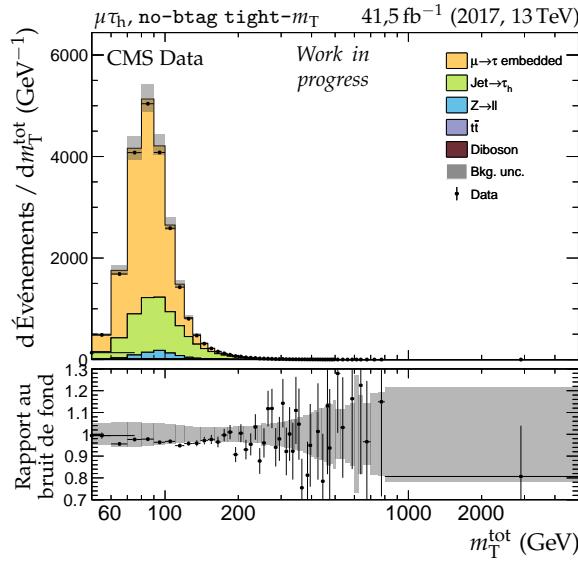
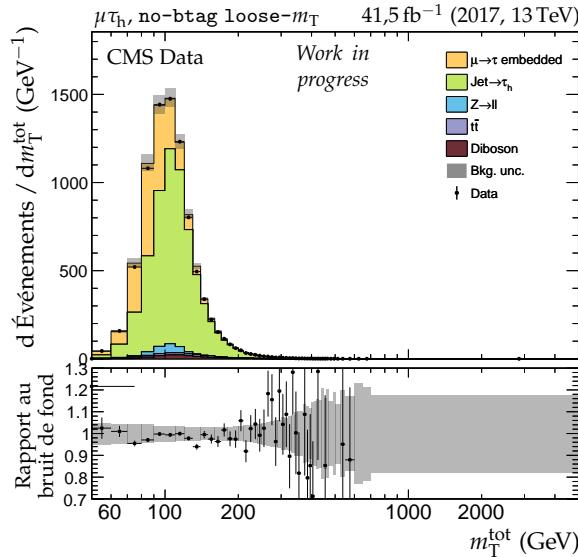


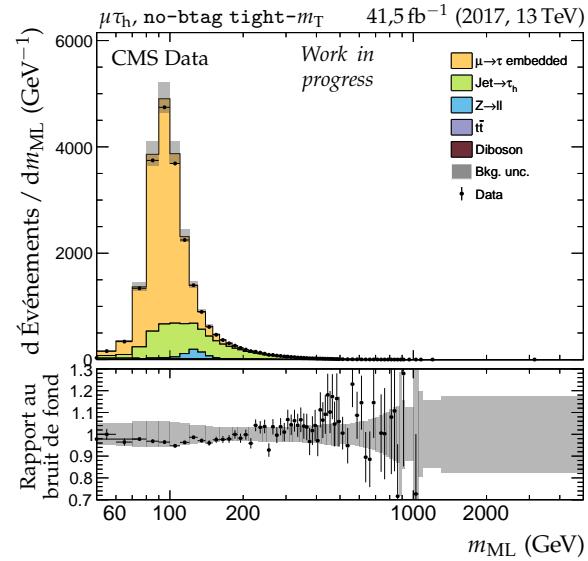
Figure X.18 – Distributions de $m_{\text{T}}^{\text{tot}}$ et m_{ML} en 2017 dans le canal $\mu\tau_h$, catégories $b\text{tag}$.



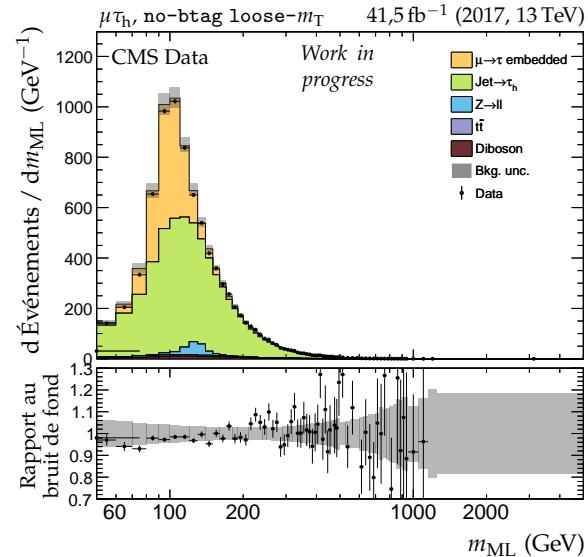
(a) Catégorie no-btag tight- m_T , m_T^{tot} .



(c) Catégorie no-btag loose- m_T , m_T^{tot} .



(b) Catégorie no-btag tight- m_T , m_{ML} .



(d) Catégorie no-btag loose- m_T , m_{ML} .

Figure X.19 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $\mu \tau_h$, catégories no-btag.

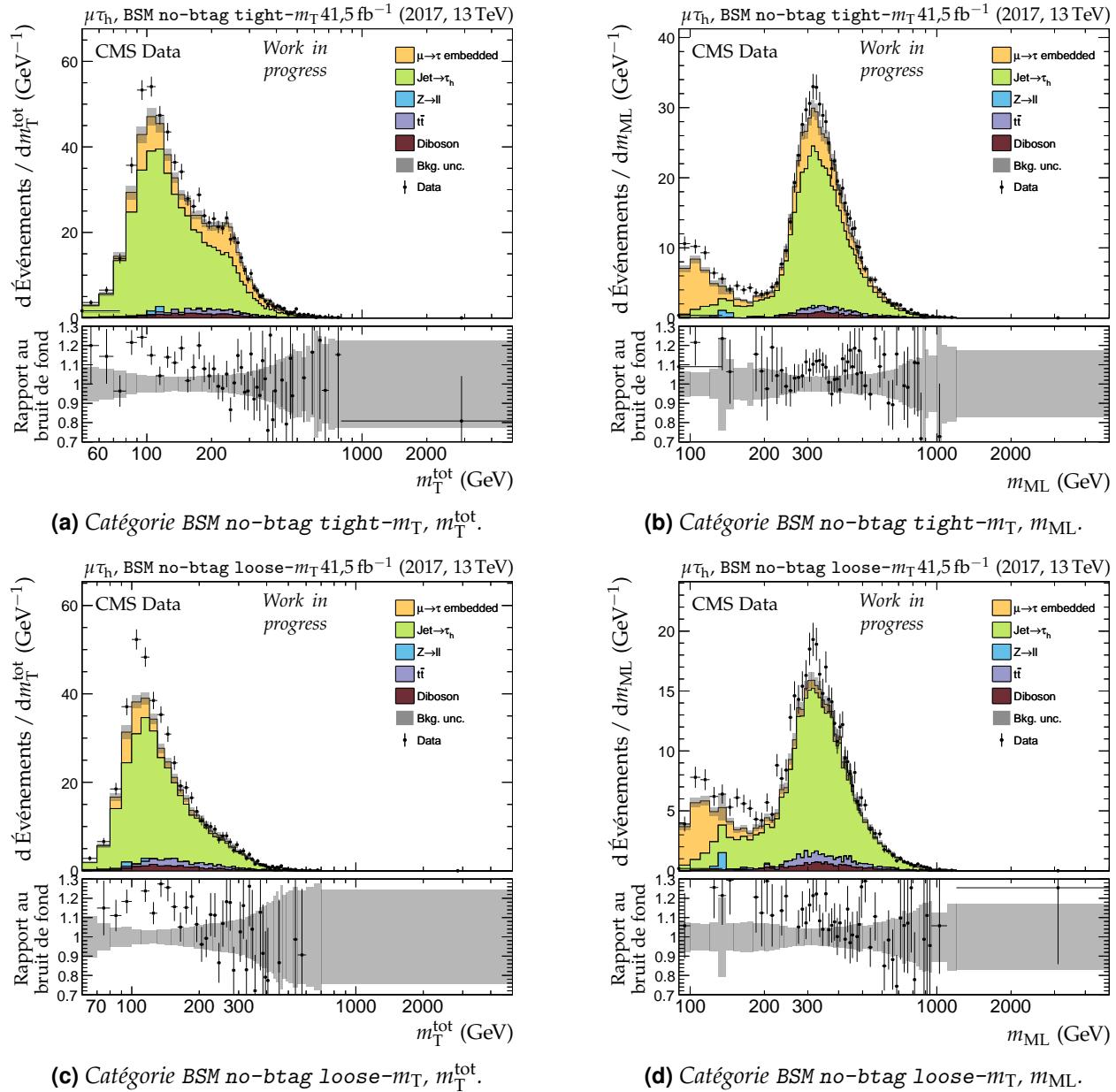
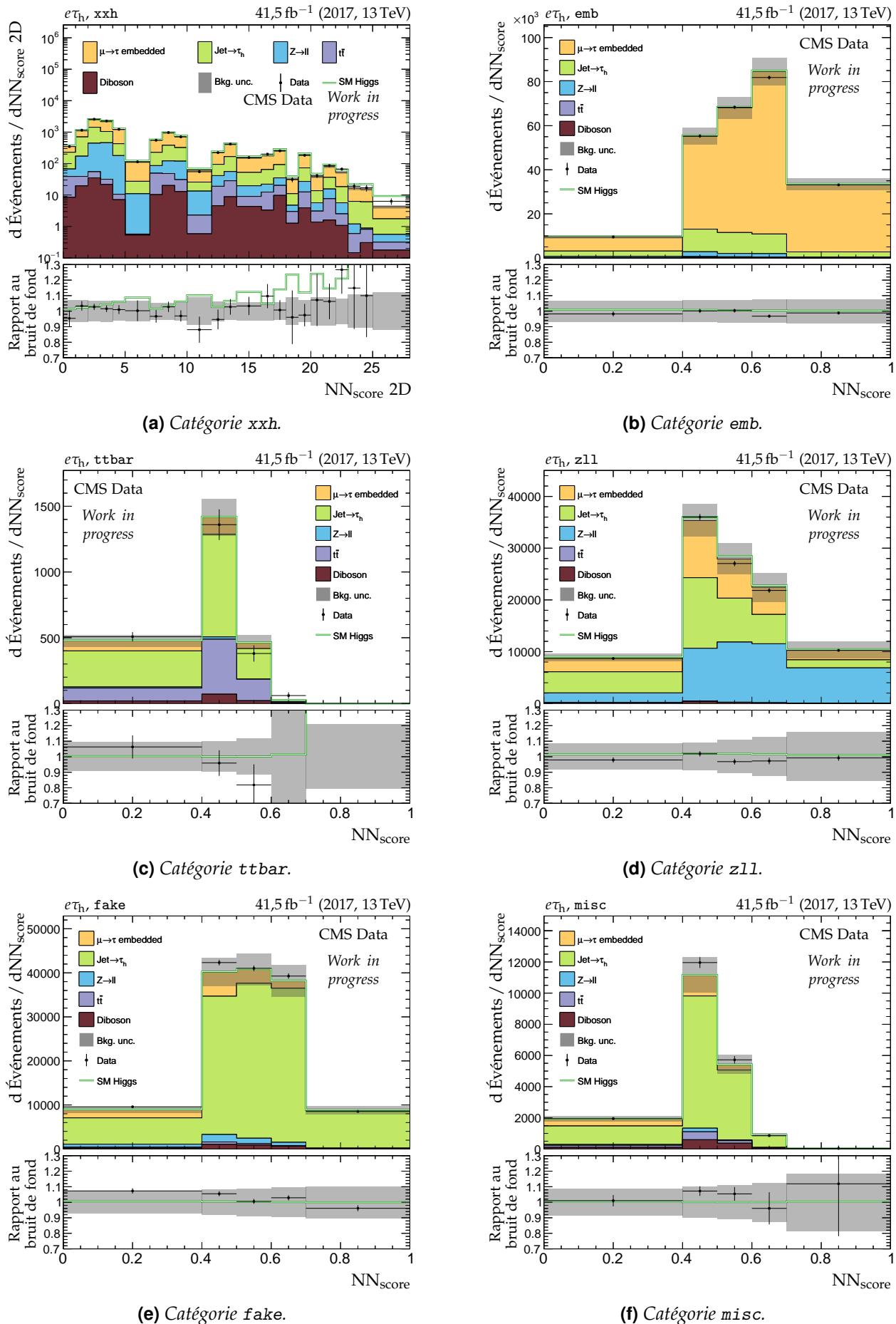


Figure X.20 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $\mu\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.



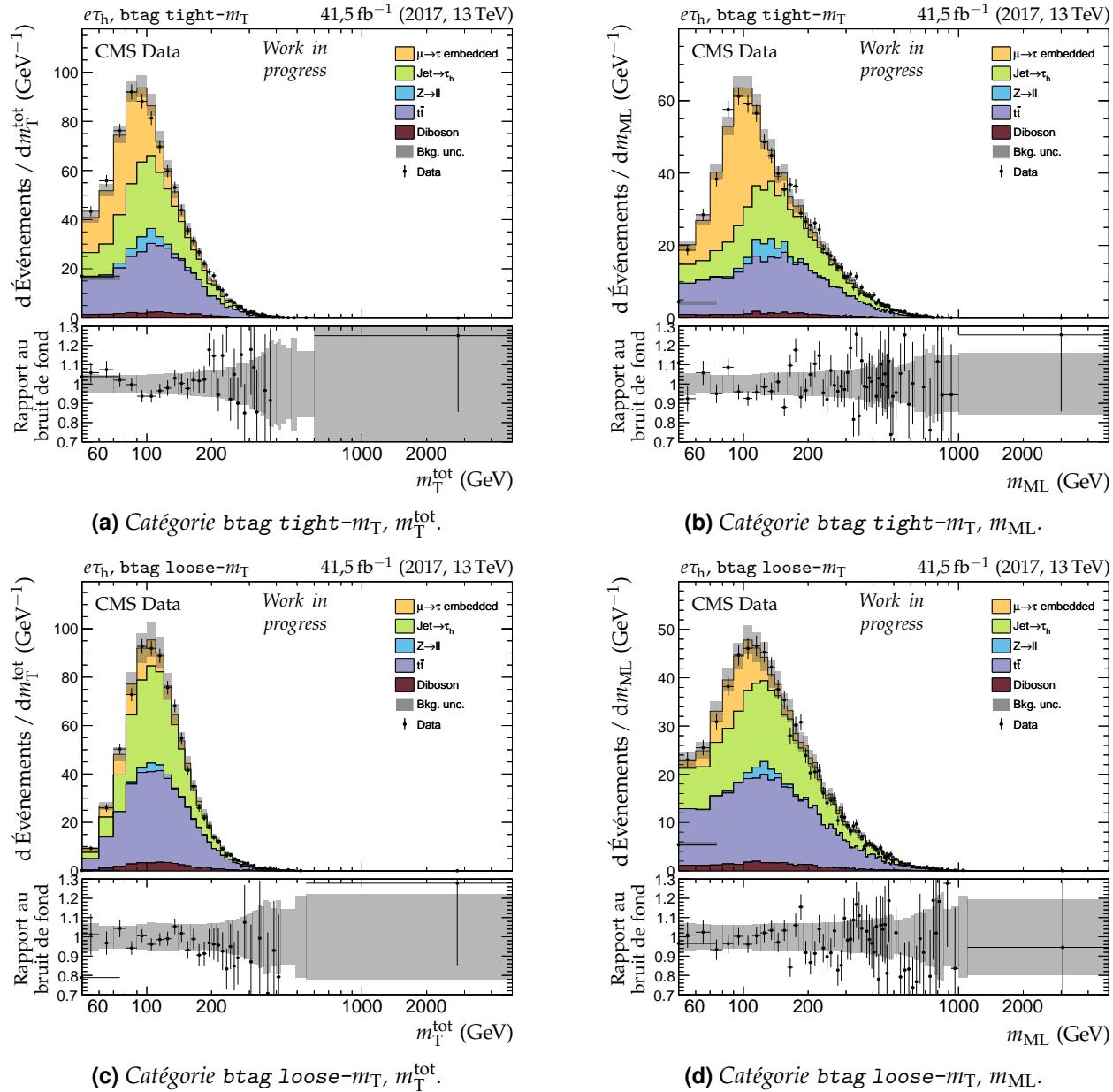


Figure X.22 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $e\tau_h$, catégories btag.

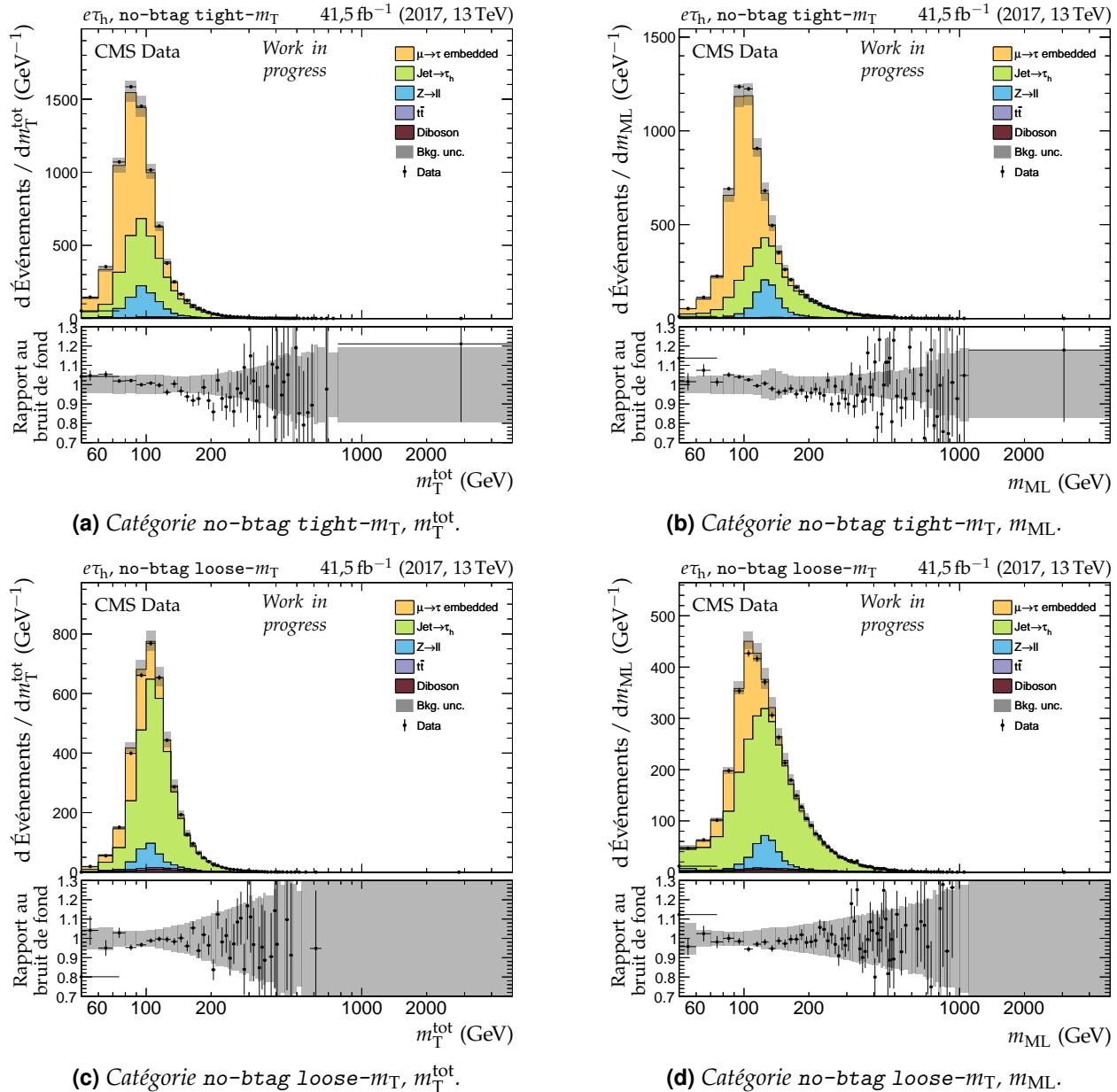


Figure X.23 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $e\tau_h$, catégories no-btag.

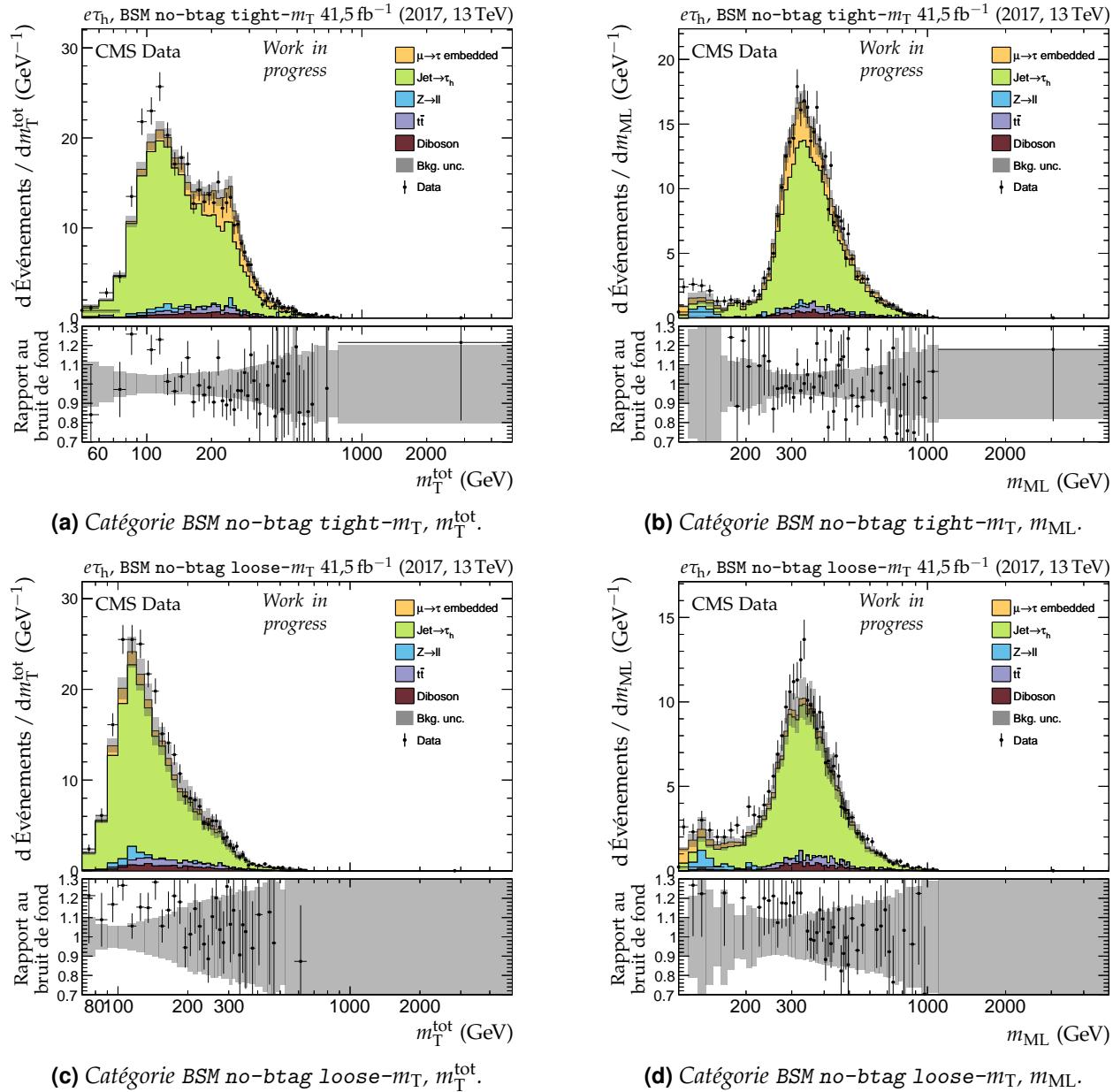
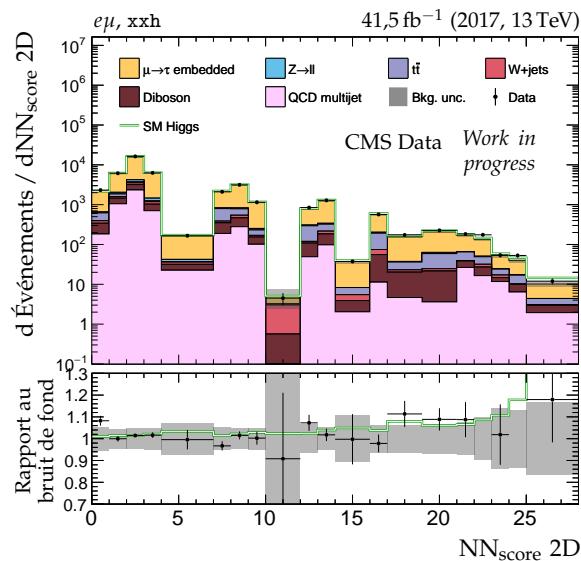
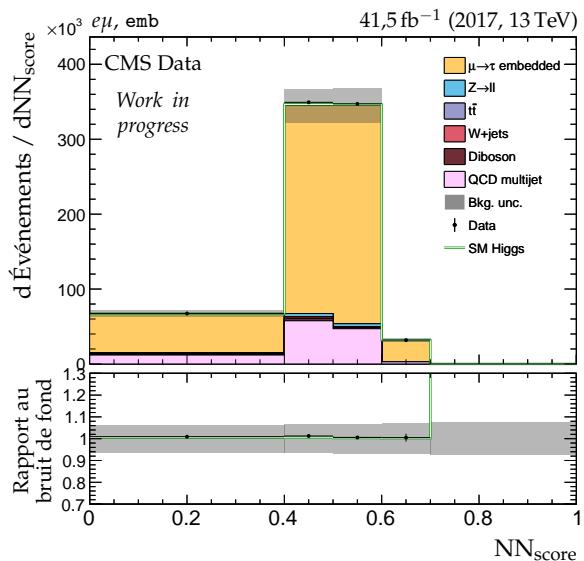


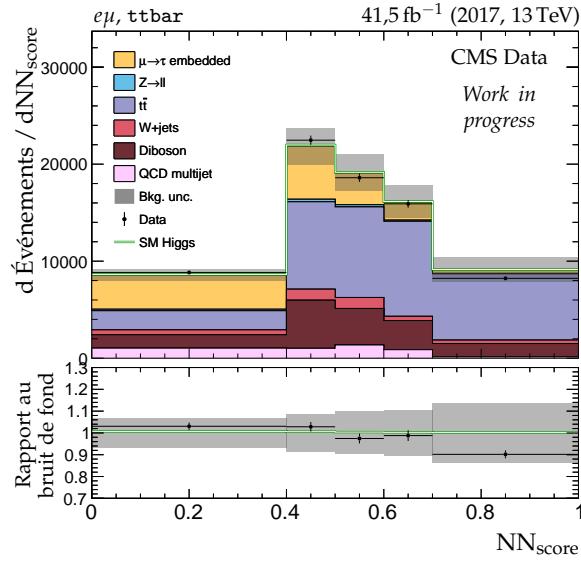
Figure X.24 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $e\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.



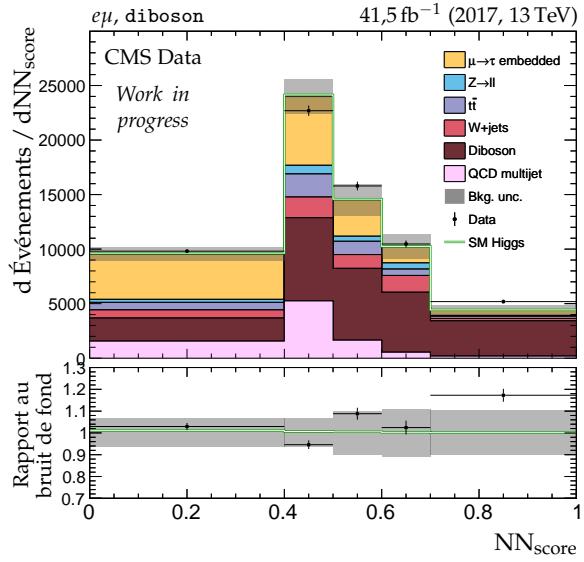
(a) Catégorie xxh.



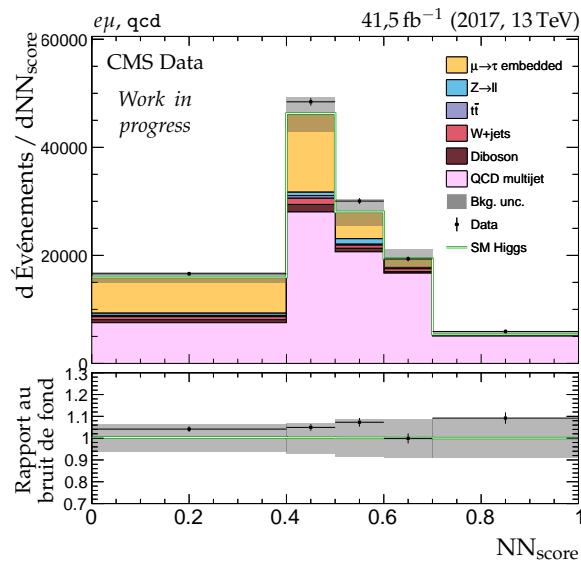
(b) Catégorie emb.



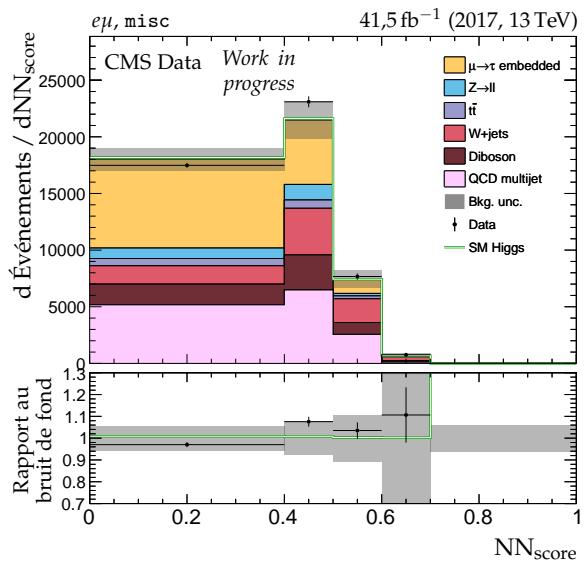
(c) Catégorie ttbar.



(d) Catégorie diboson.



(e) Catégorie qcd.



(f) Catégorie misc.

Figure X.25 – Distributions de NN_{score} en 2017 dans le canal e μ .

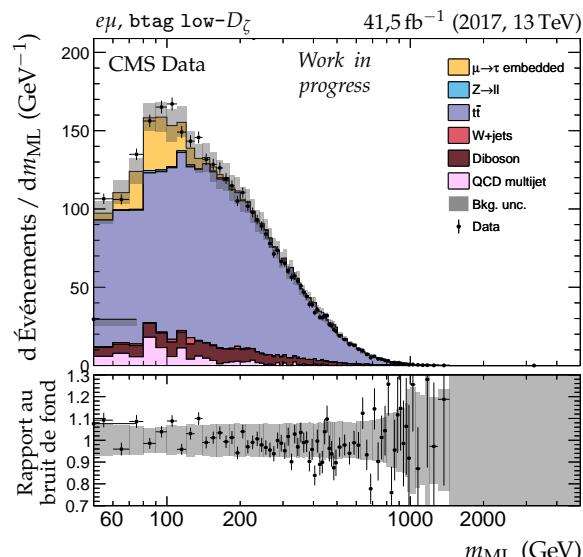
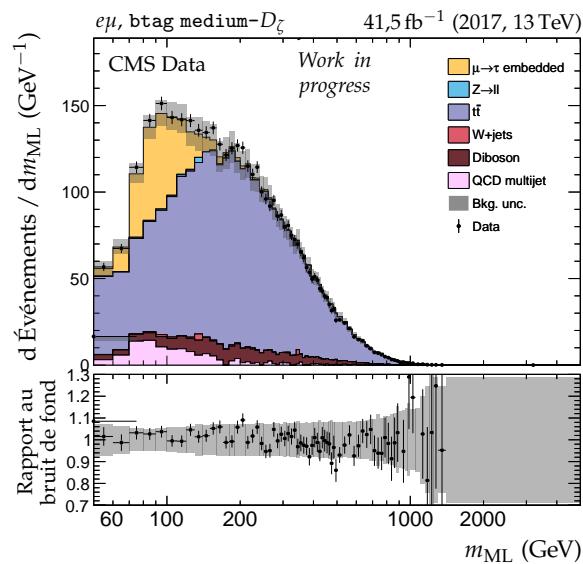
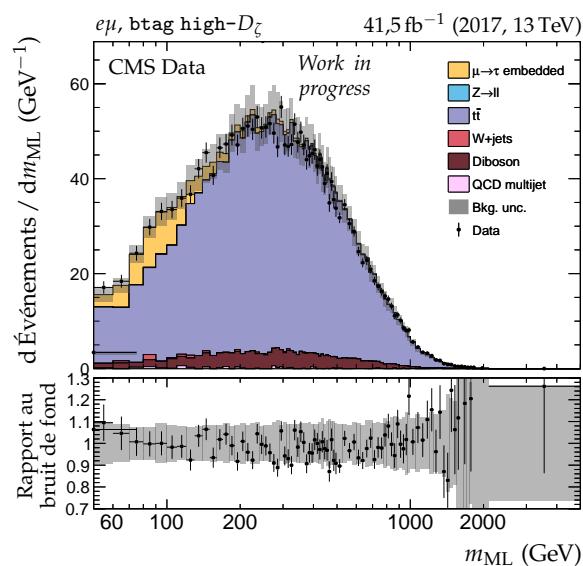
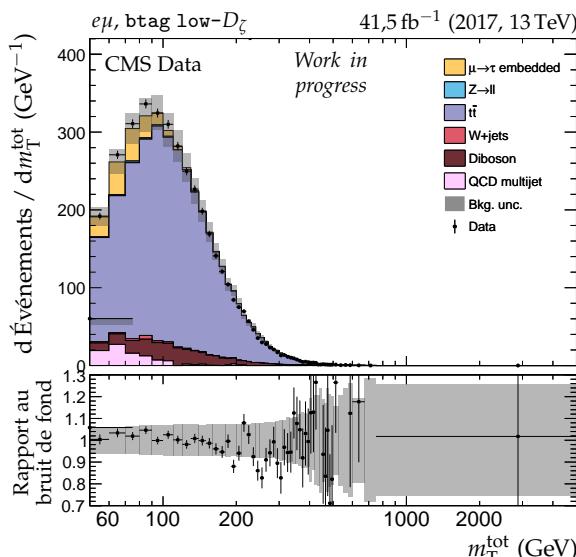
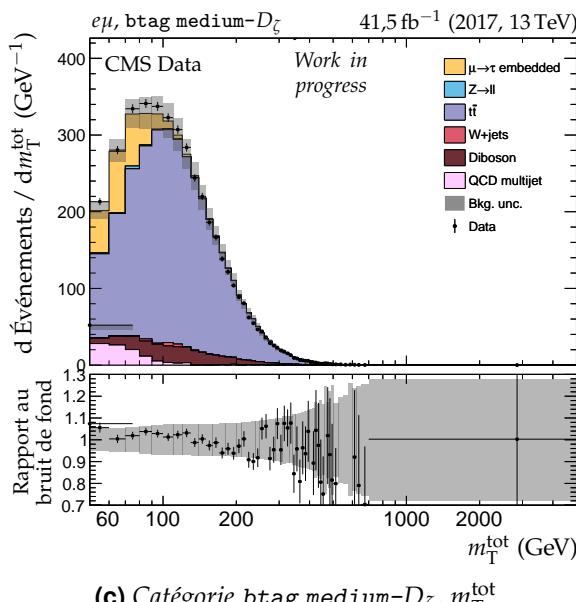
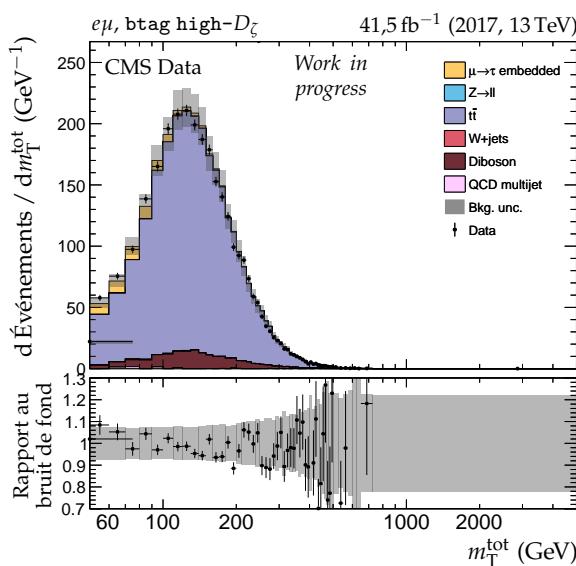


Figure X.26 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $e\mu$, catégories btag.

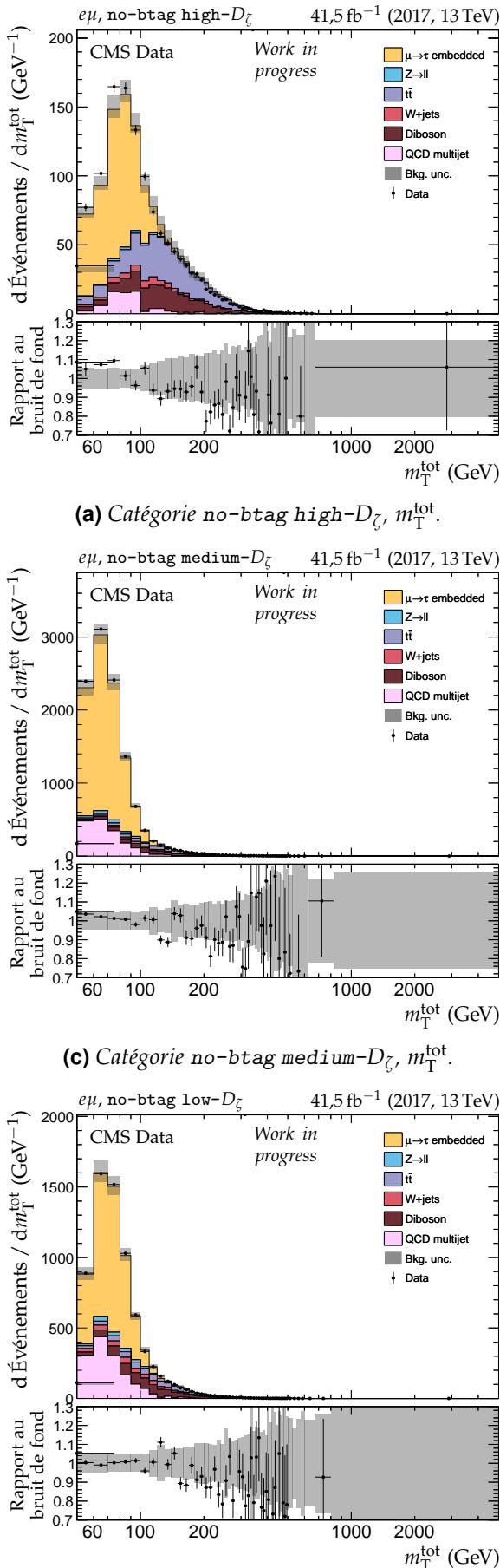
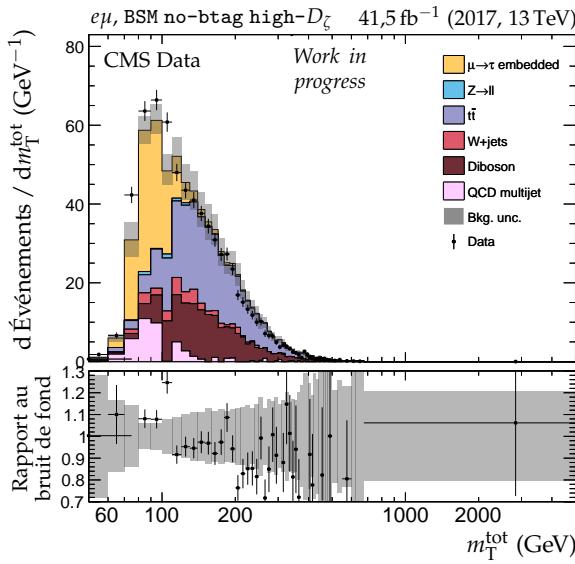
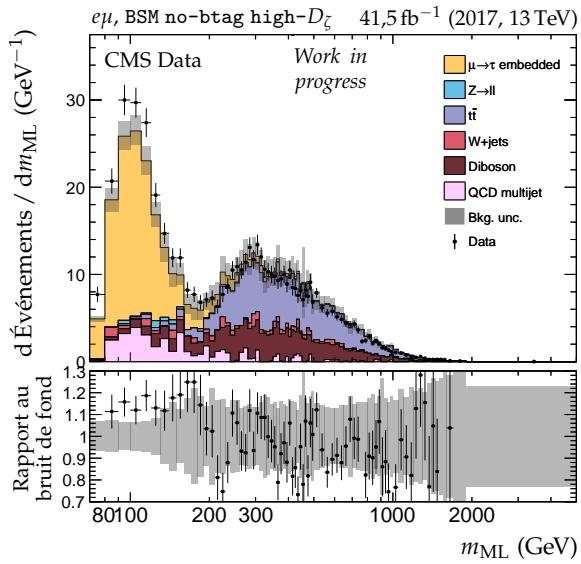
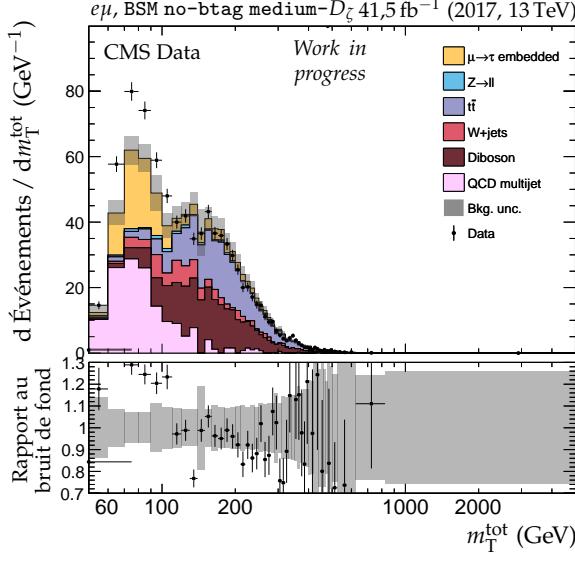
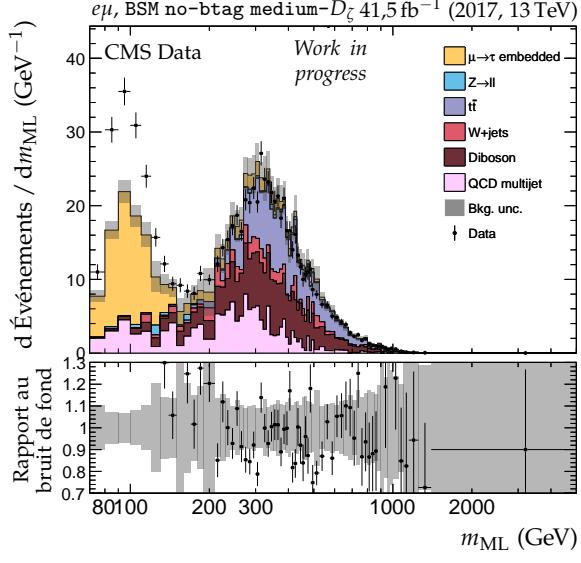
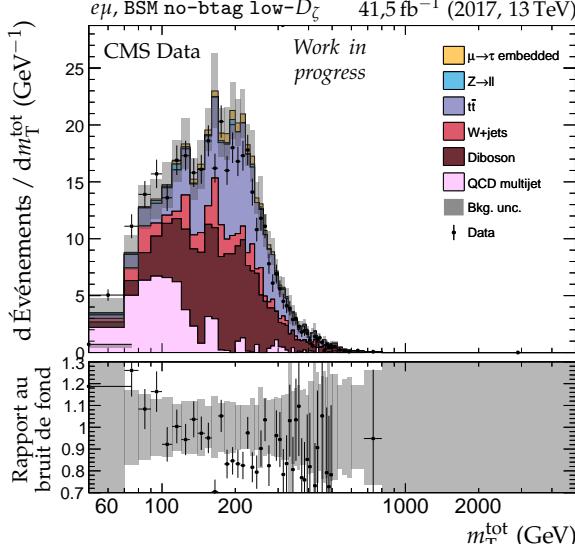
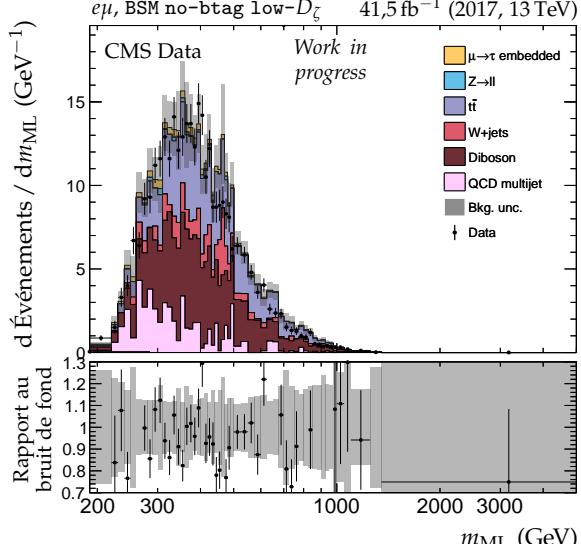


Figure X.27 – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal $e\mu$, catégories no-btag.

(a) Catégorie BSM no-btag high- D_ζ , m_T^{tot}.(b) Catégorie BSM no-btag high- D_ζ , m_{ML}.(c) Catégorie BSM no-btag medium- D_ζ , m_T^{tot}.(d) Catégorie BSM no-btag medium- D_ζ , m_{ML}.(e) Catégorie BSM no-btag low- D_ζ , m_T^{tot}.(f) Catégorie BSM no-btag low- D_ζ , m_{ML}.**Figure X.28** – Distributions de m_T^{tot} et m_{ML} en 2017 dans le canal e μ , catégories no-btag avec m_{SVFIT} \geqslant 250 GeV.

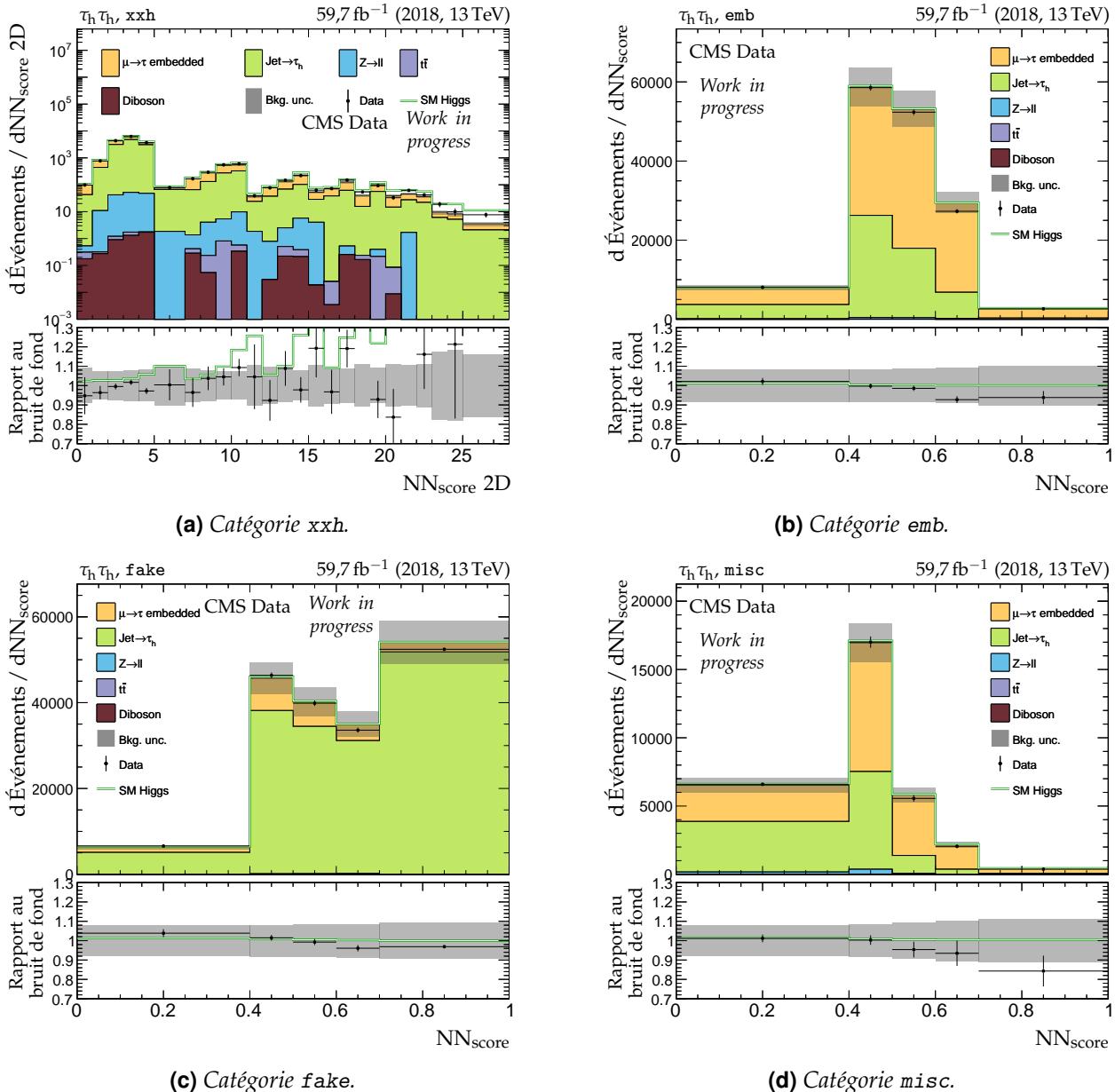


Figure X.29 – Distributions de NN_{score} en 2018 dans le canal $\tau_h\tau_h$.

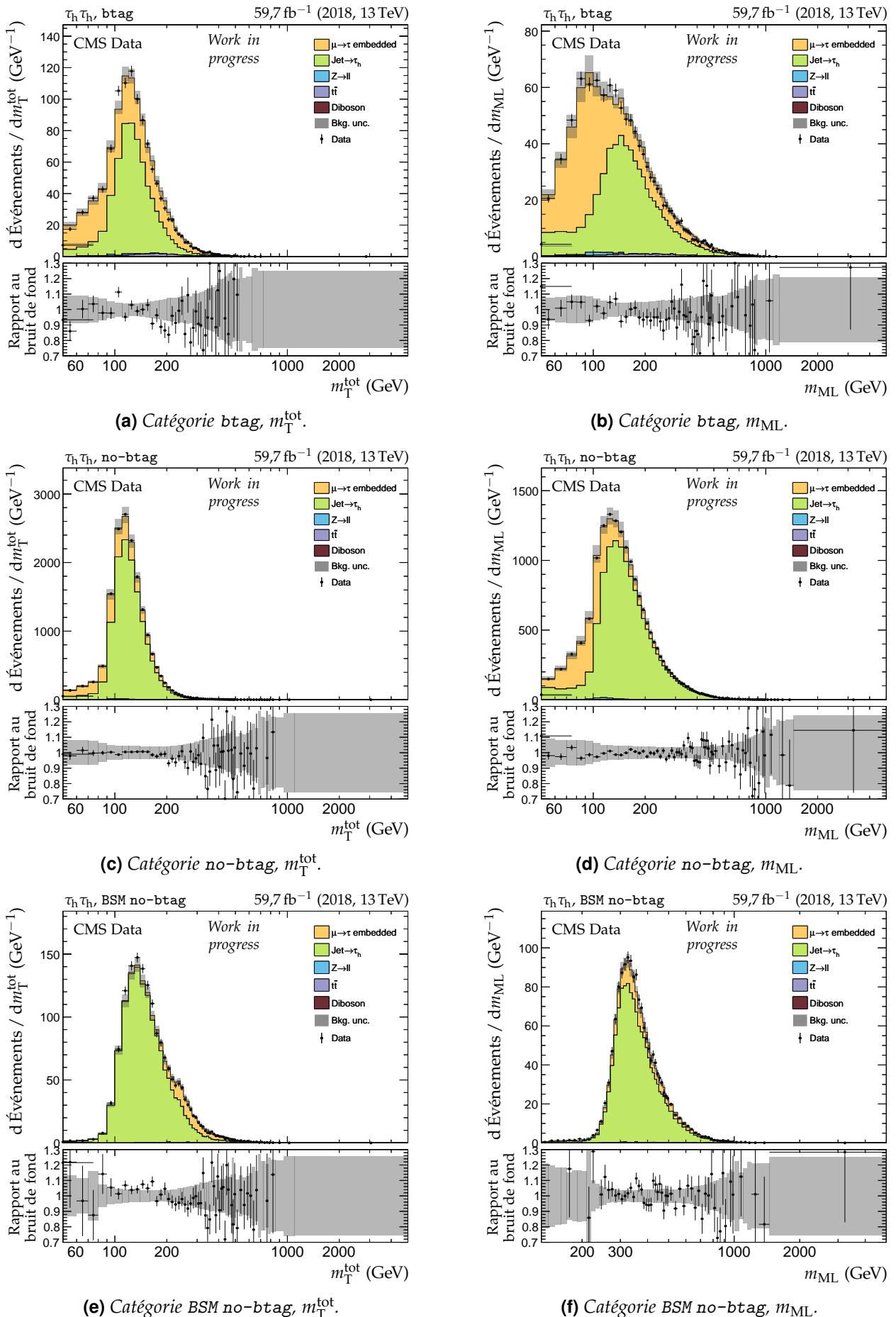
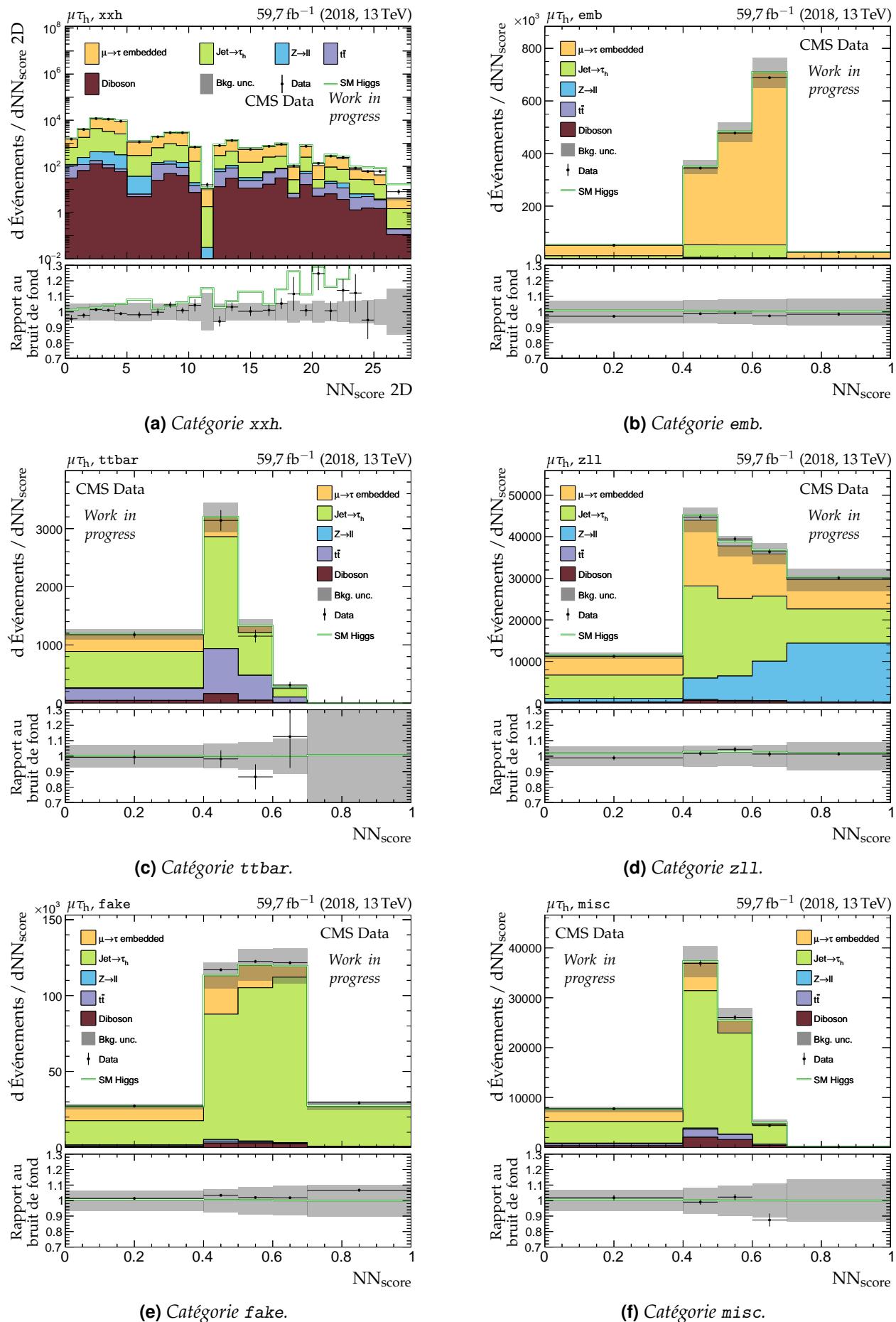


Figure X.30 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $\tau_h \tau_h$.


 Figure X.31 – Distributions de NN_{score} en 2018 dans le canal $\mu\tau_h$.

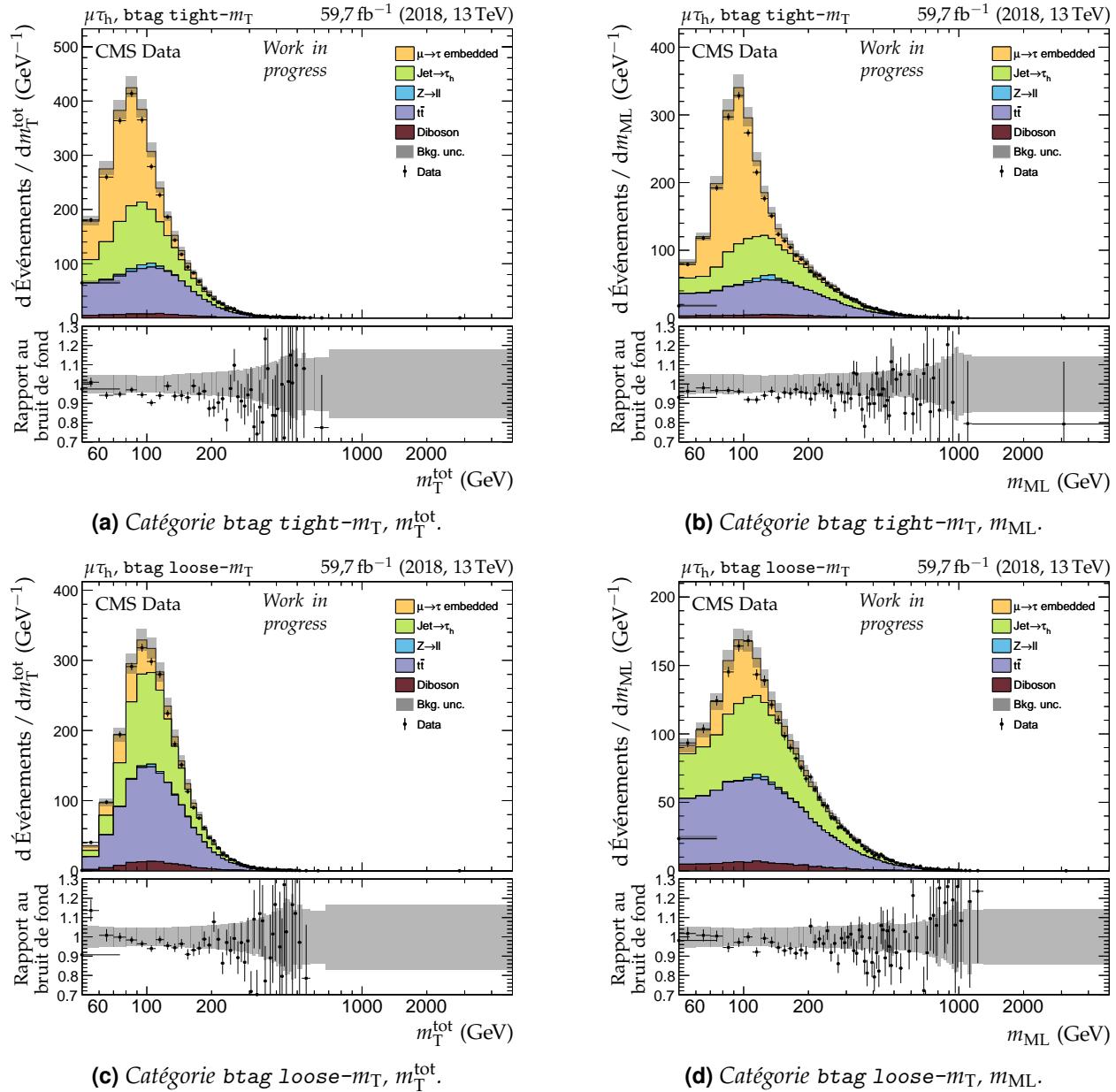
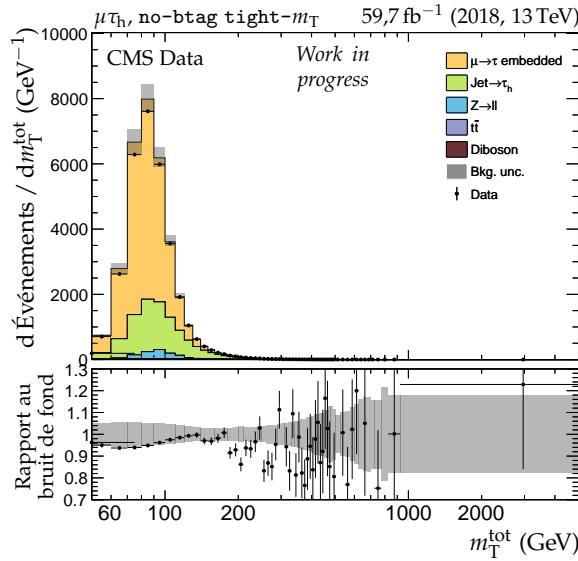
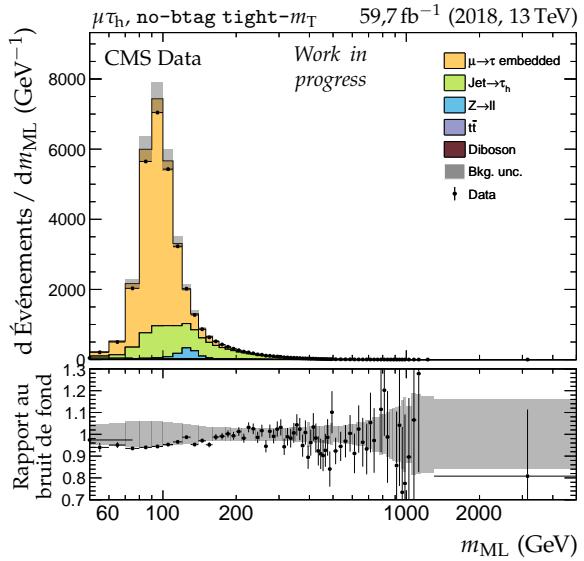
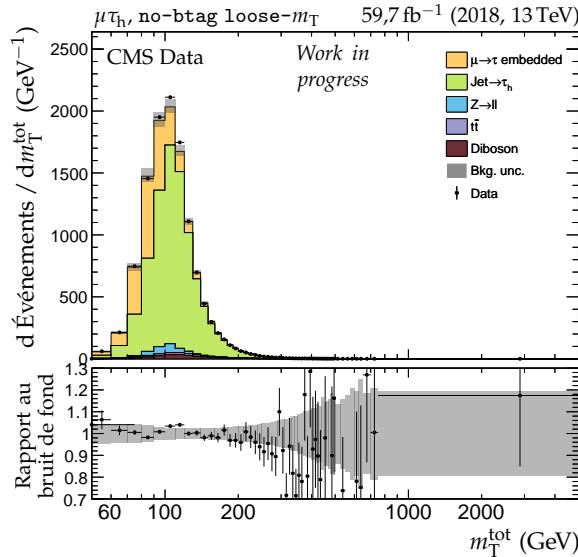
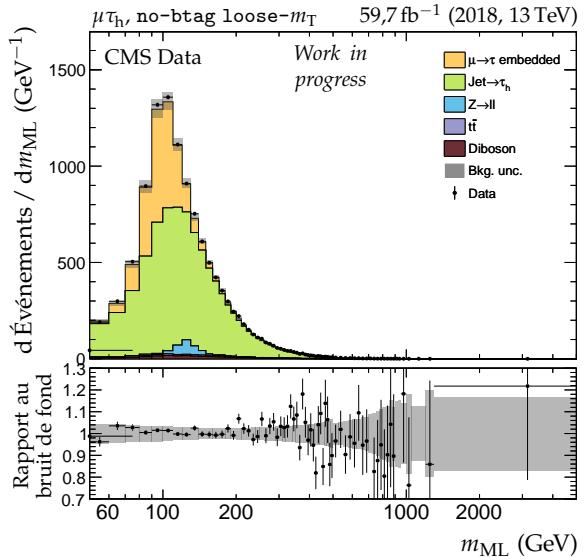


Figure X.32 – Distributions de $m_{\text{T}}^{\text{tot}}$ et m_{ML} en 2018 dans le canal $\mu\tau_h$, catégories $b\text{tag}$.

(a) Catégorie no-btag tight- m_T , m_T^{tot} .(b) Catégorie no-btag tight- m_T , m_{ML} .(c) Catégorie no-btag loose- m_T , m_T^{tot} .(d) Catégorie no-btag loose- m_T , m_{ML} .**Figure X.33** – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $\mu\tau_h$, catégories no-btag.

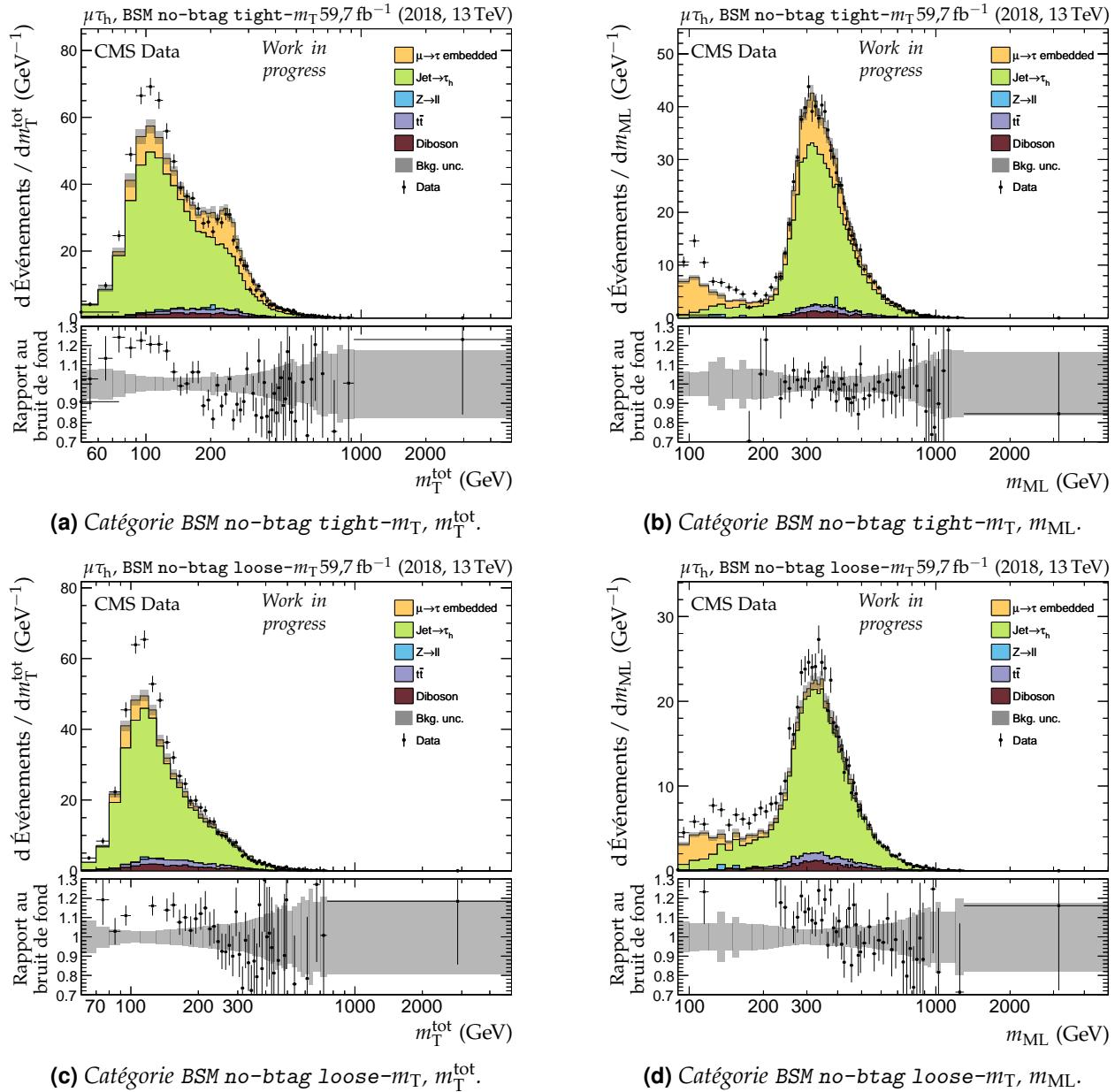


Figure X.34 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $\mu\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.

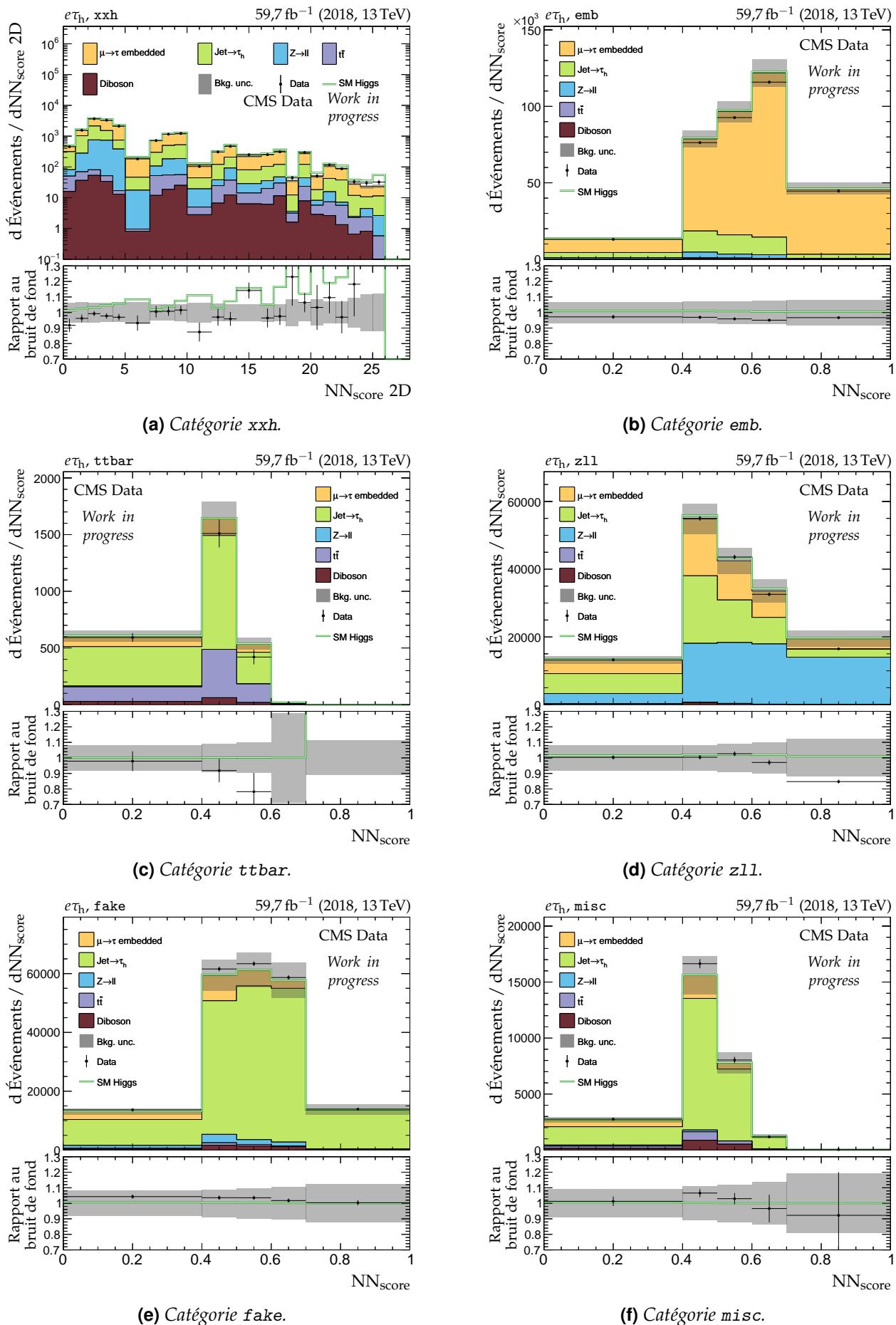


Figure X.35 – Distributions de NN_{score} en 2018 dans le canal $e\tau_h$.

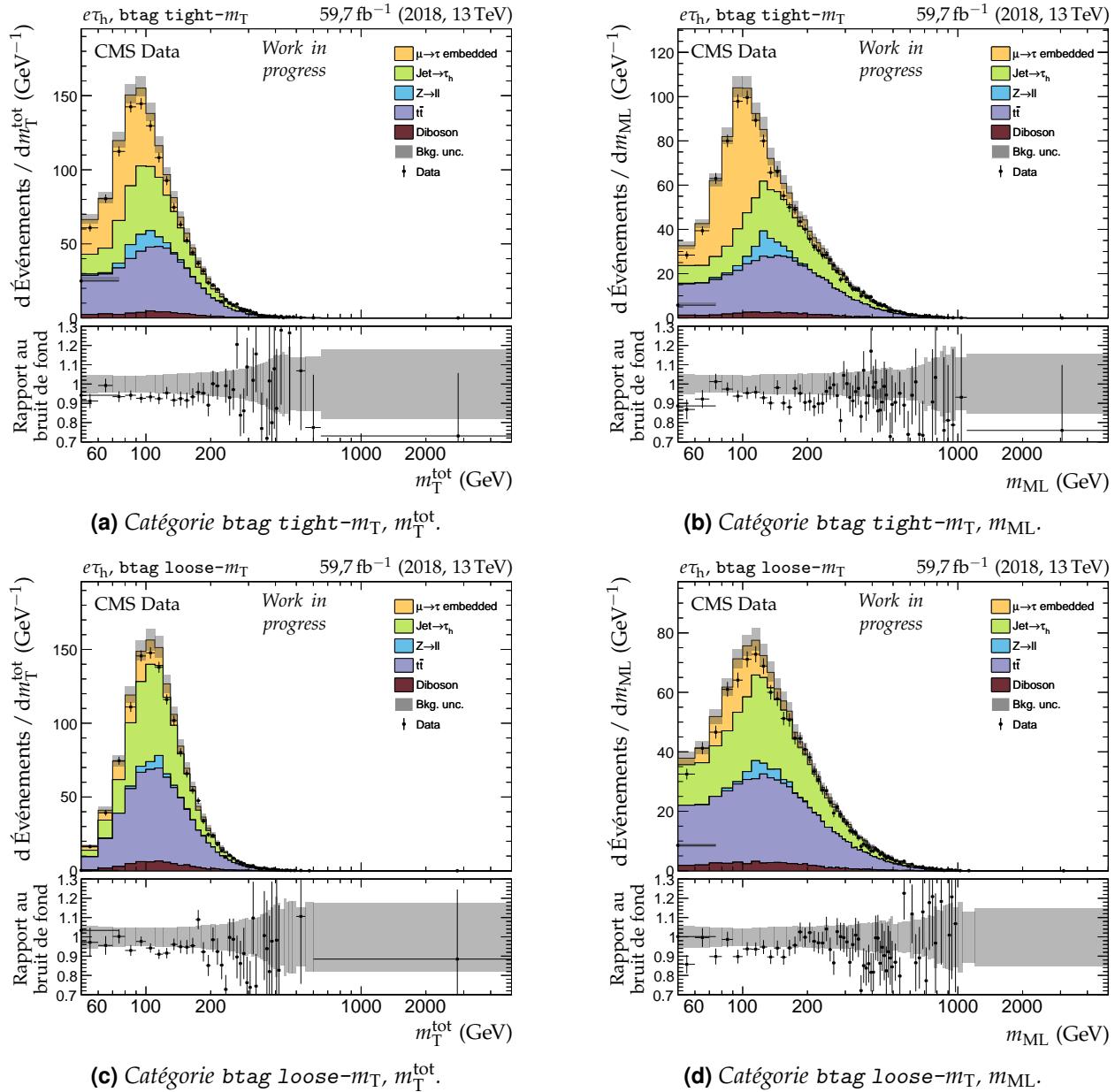
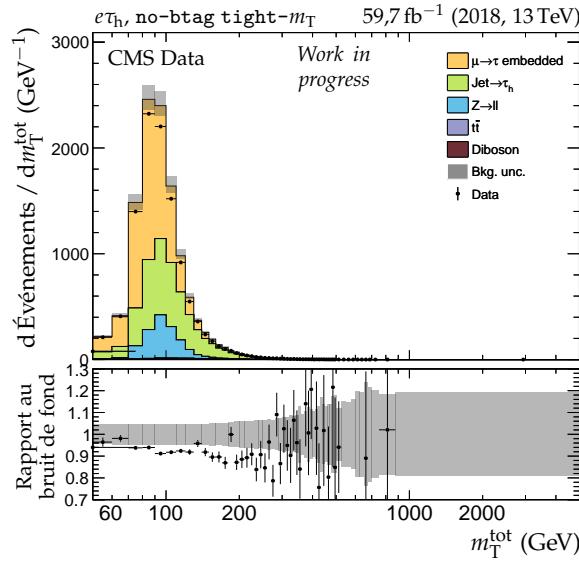
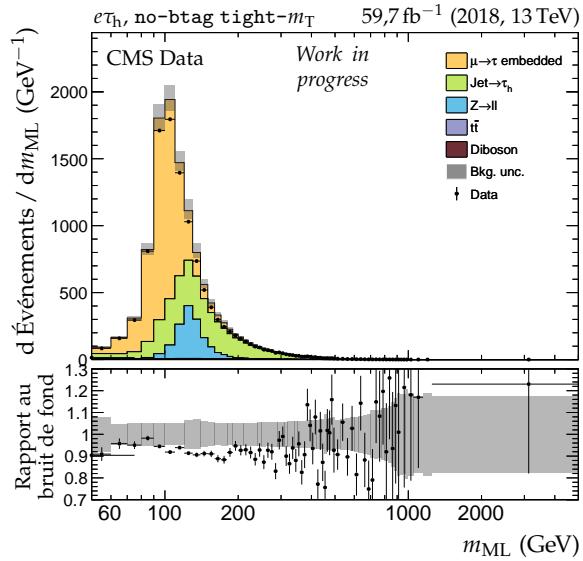
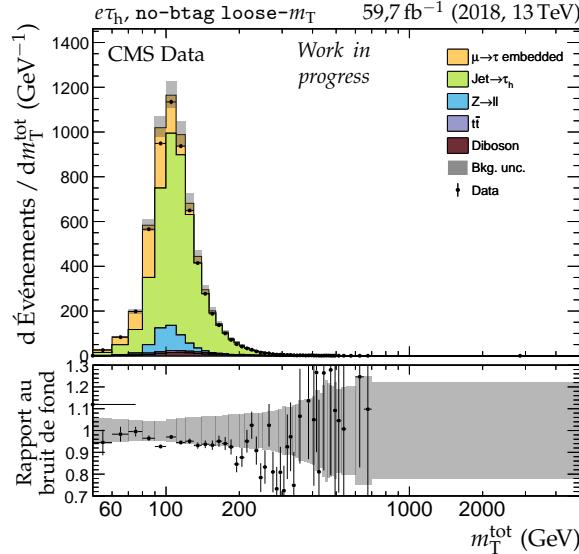
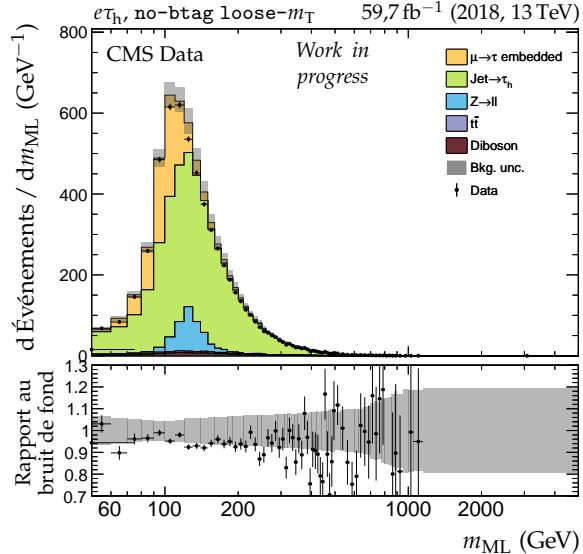


Figure X.36 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\tau_h$, catégories btag.

(a) Catégorie no-btag tight- m_T , m_T^{tot} .(b) Catégorie no-btag tight- m_T , m_{ML} .(c) Catégorie no-btag loose- m_T , m_T^{tot} .(d) Catégorie no-btag loose- m_T , m_{ML} .**Figure X.37** – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\tau_h$, catégories no-btag.

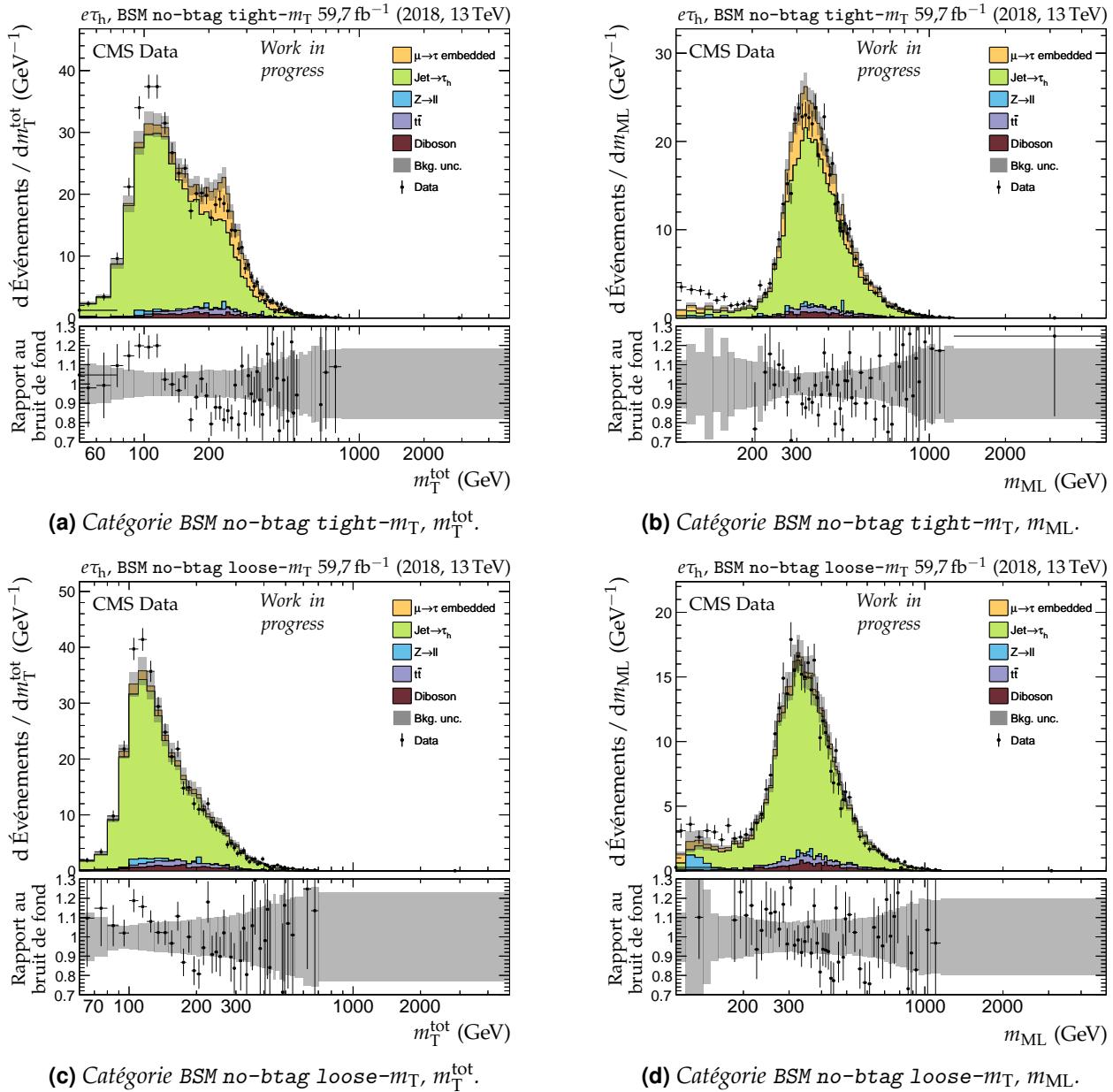
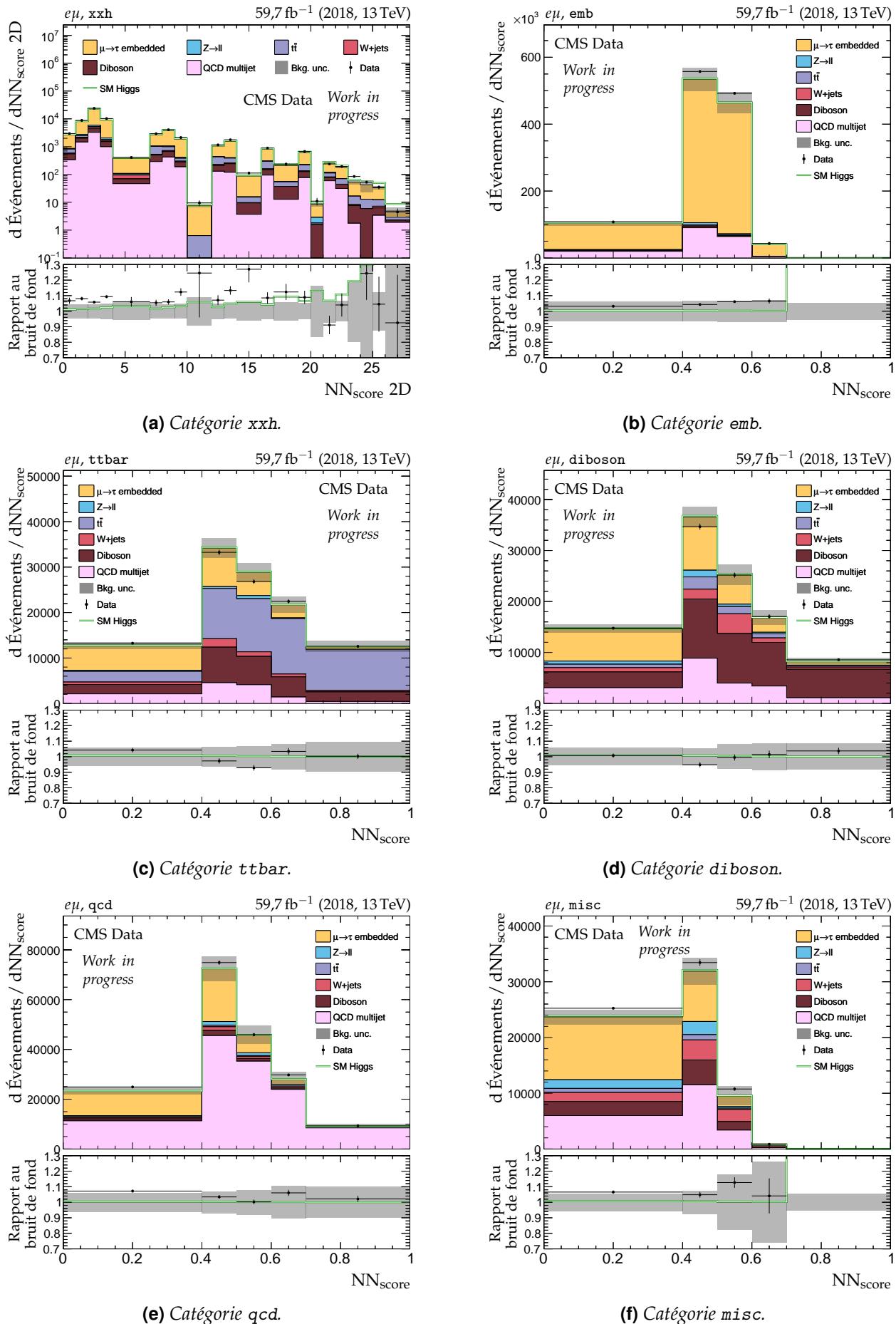


Figure X.38 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\tau_h$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.

Figure X.39 – Distributions de NN_{score} en 2018 dans le canal $e\mu$.

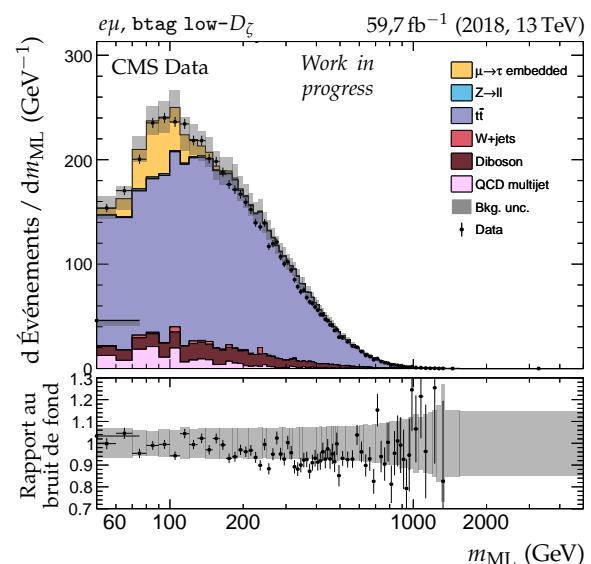
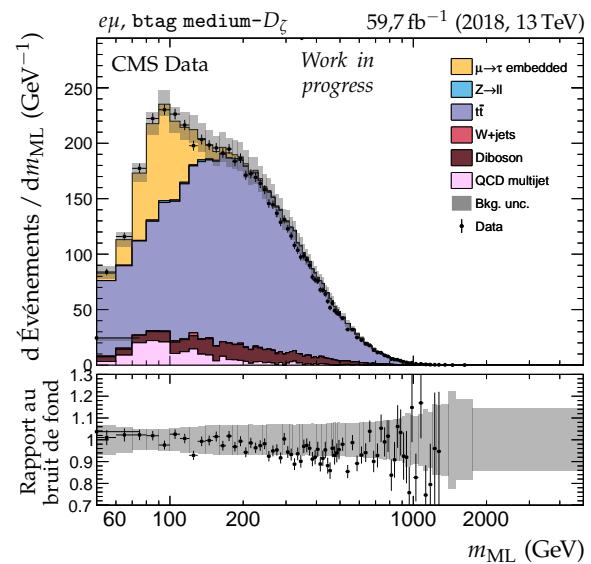
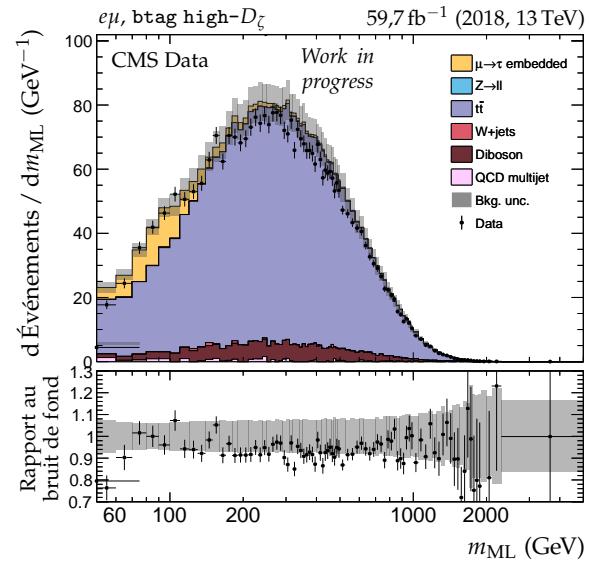
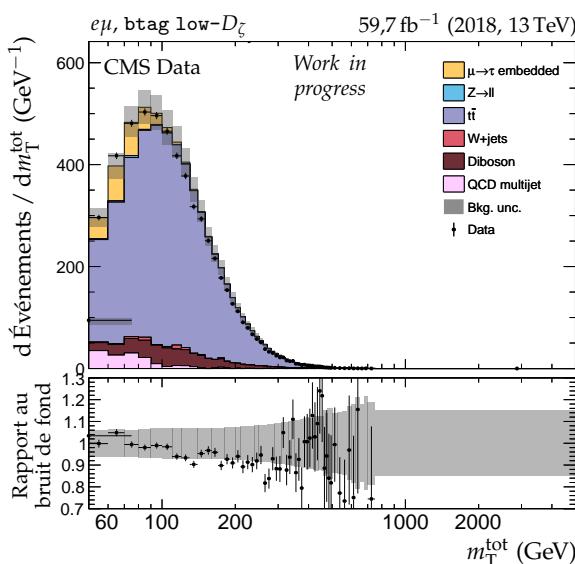
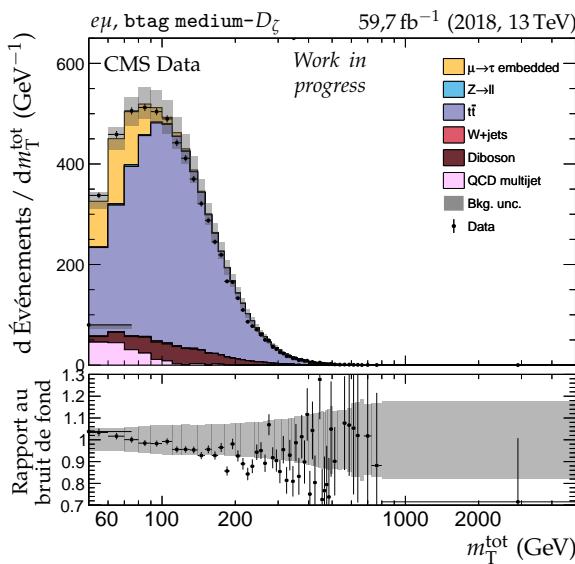
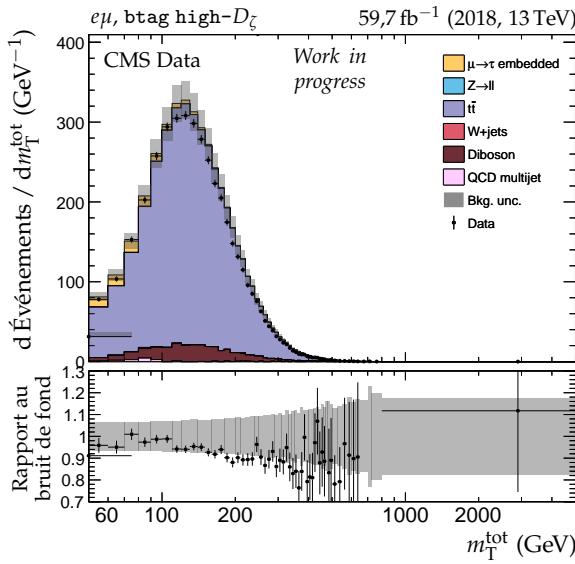


Figure X.40 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\mu$, catégories $b\text{tag}$.

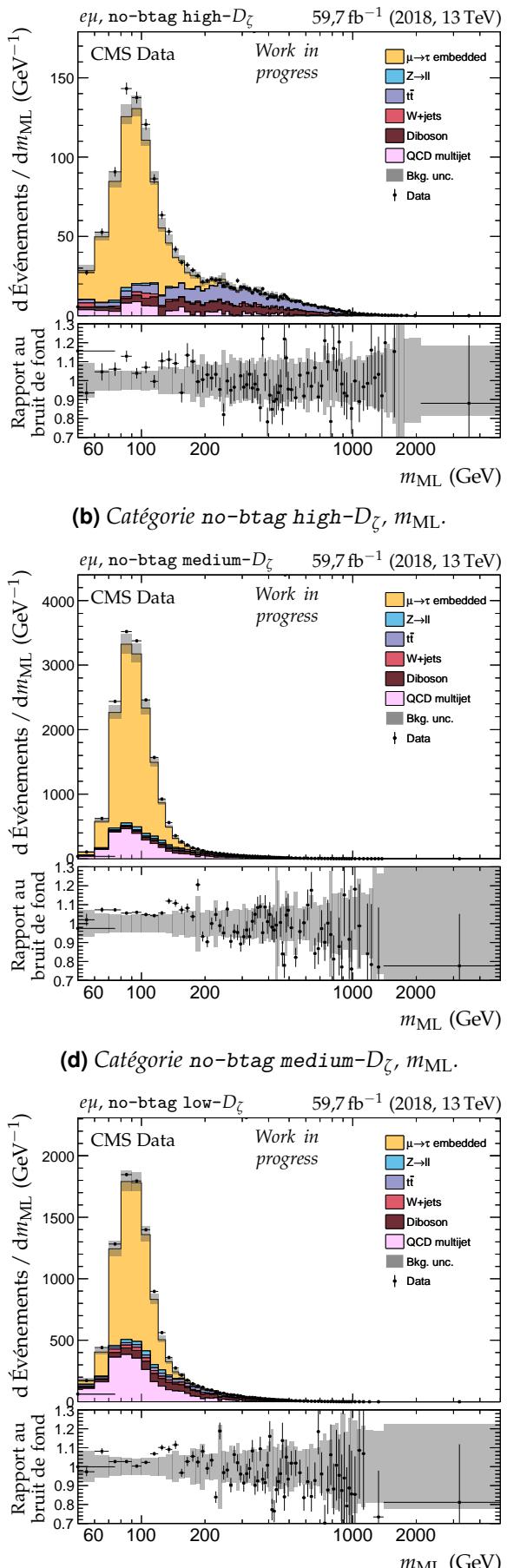
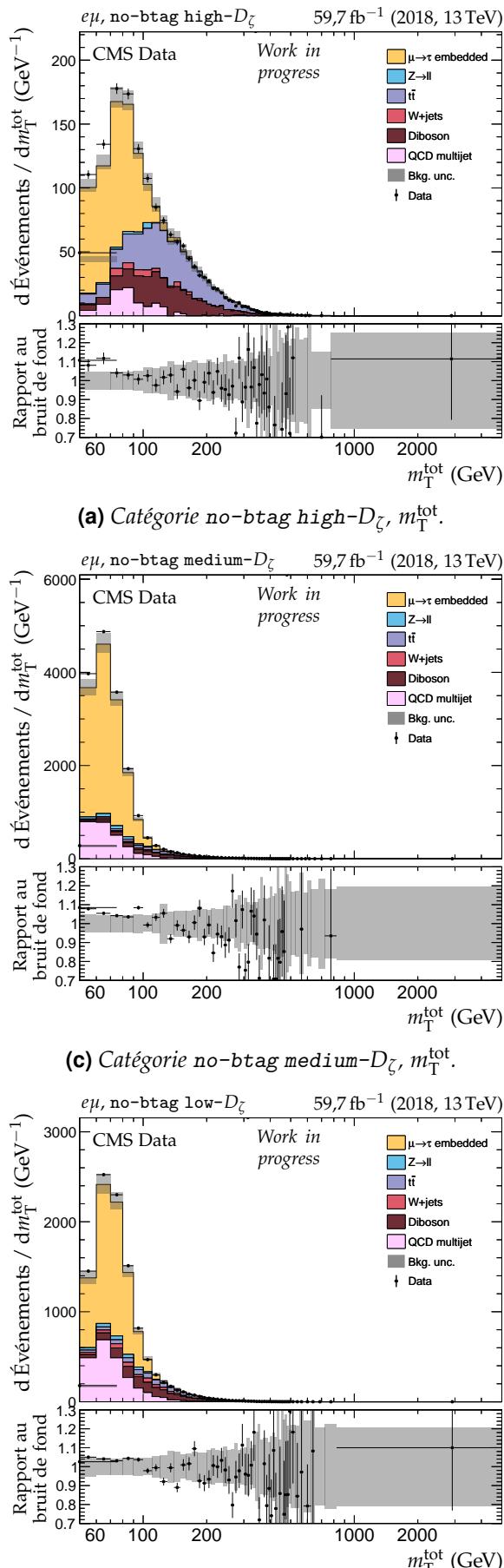


Figure X.41 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\mu$, catégories no-btag.

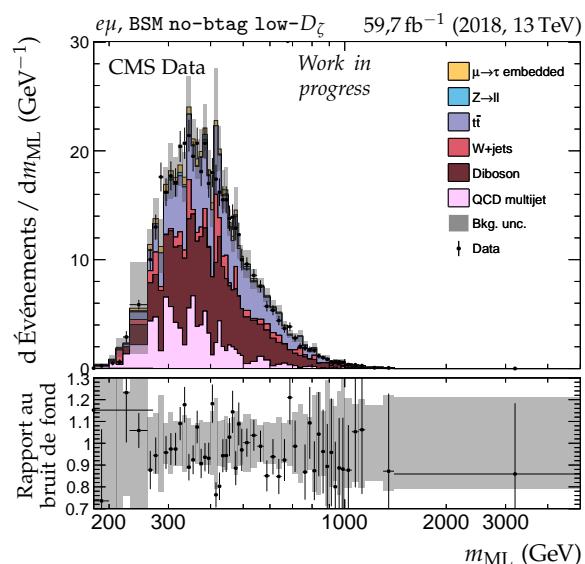
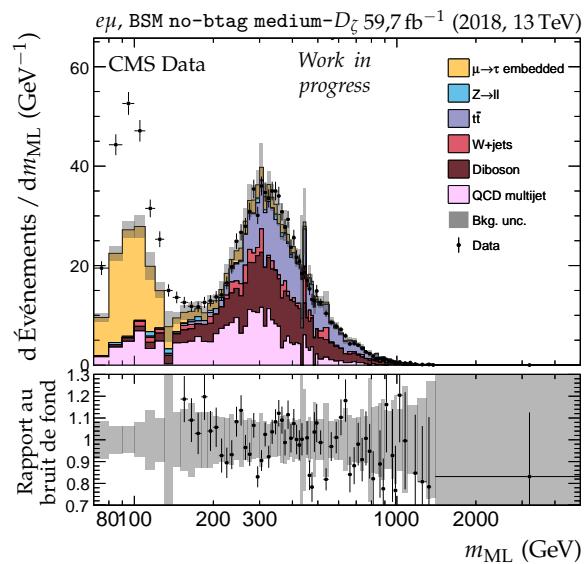
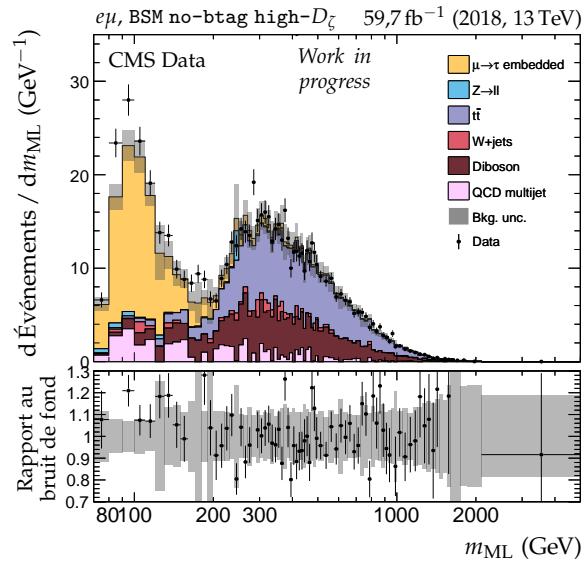
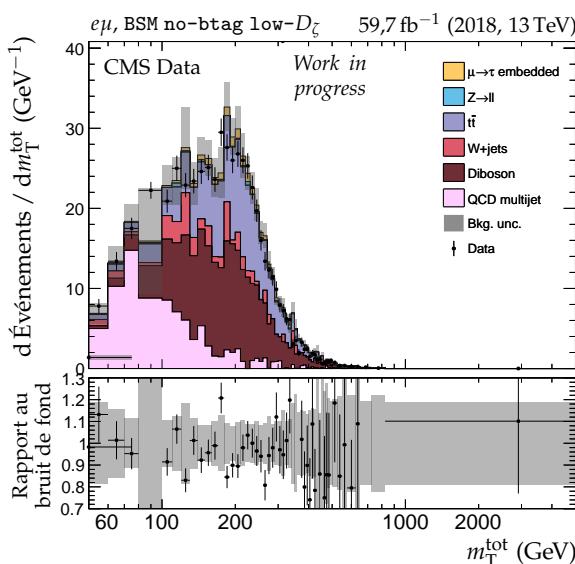
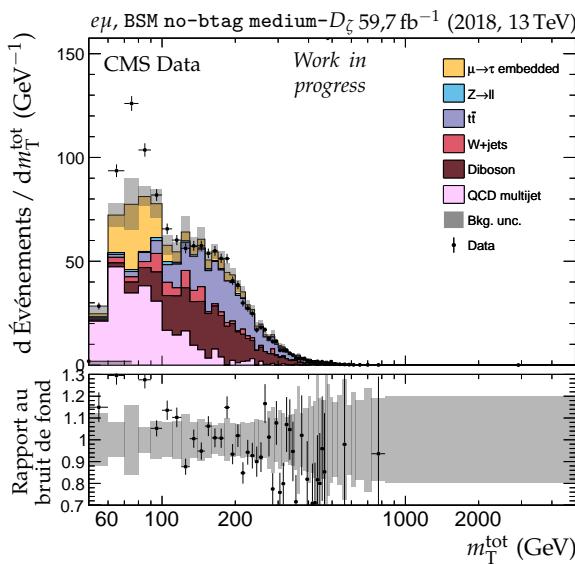
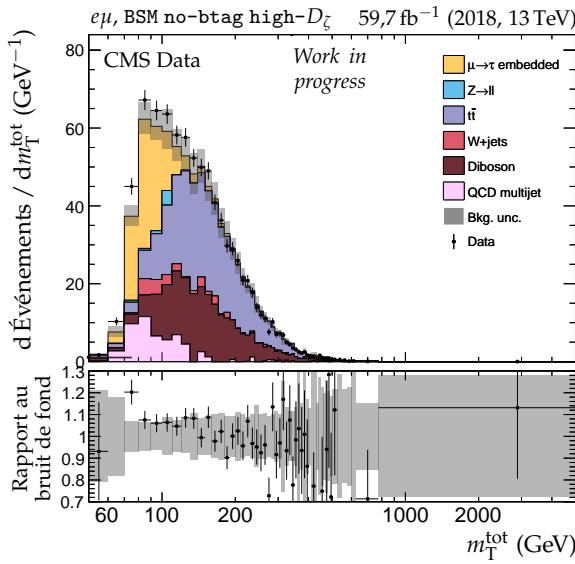


Figure X.42 – Distributions de m_T^{tot} et m_{ML} en 2018 dans le canal $e\mu$, catégories no-btag avec $m_{\text{SVFIT}} \geq 250 \text{ GeV}$.

