Phase diagram of $\beta'$-BEDT-TTF salts HIORI KINO, NIMS, Japan, HIROSHI KONTANI, Nagoya Univ., Japan, TSUYOSHI MIYAZAKI, NIMS, Japan — We present theoretical studies on the phase diagram of layered organic charge transfer salts, $\beta'-(\text{BEDT-TTF})_2\text{ICl}_2$ and $\beta'-(\text{BEDT-TTF})_2\text{AuCl}_2$. The former shows the highest superconducting transition temperature ($T_c \approx 14.2$ K under a high hydrostatic pressure) among the organic superconductors. We study an effective model using the fluctuation-exchange (FLEX) approximation based on the results of the first-principles calculations in DFT/GGA under applied pressures. In the obtained phase diagram of $\beta'-(\text{BEDT-TTF})_2\text{ICl}_2$, the superconductivity with $d_{xy}$-like symmetry is realized next to the antiferromagnetic phase. The calculated $T_c$ quantitatively coincides well with the experimental one.