Comment on egusphere-2022-252
Haidong Pan


This is a nice paper which clarifies the seasonality of M_2 tide. For a long time, I am puzzled about the use of H1 for a semi-diurnal wave and it seems that no one (except this paper) can give me the answer. I have few suggestions which may further improve this paper.

First, I strongly suggest the author to also discuss the seasonality of S2, K1 and O1 tides. In most previous studies, they only focus on the seasonality of M2 but ignore S2, K1 and O1. In fact, there are also lots of confusion on the seasonality of S2/K1/O1 tides. Du and Yu(2021) only clarify some confusion on the seasonality of M2. When I discussed with them, I was surprise that they did not know the seasonality of S2, K1 and O1 tides at all. The frequency of the K2 (P1) tide is equal to that of the S2 (K1) plus (minus) the frequency of the semi-annual cycle. When we explore the seasonality the K1 and S2 tides, we need to remove P1 and K2 tides first via harmonic analysis (HA). However, HA is a frequency-depend method, it can extract the amplitude and phase of one specific frequency, thus, HA cannot distinguish different origins of a constituent which means that partial semi-annual cycles of K1 and S2 tides are also removed. How to solve this problem?

Second, section 3 shows three nice examples of M2 seasonality. Maybe you can add some maps/tables of tide gauges and tidal information which can help readers know more about local environment and tidal dynamics.

Finally, the nonlinear interaction between K1 and O1 tides can generate KO2 tide which has the same frequency as M2. Since K1 and O1 tides show clear seasonality, thus, KO2 should also have clear seasonality which means that the energy of K1/O1 seasonality is transferred to M2 seasonality. Also, the nonlinear interaction between P1 and O1 tides can generate OP2 tide which has the same frequency as MSK2. Thus, the energy of P1/O1 seasonality can be transferred to M2 seasonality. I think above processes may occur in some coastal areas where diurnal tides are very strong and can be added into the paper.