VEGETATION TEST CASE (veg\_test.h) :

File Written by: Tarandeep S. Kalra and Alexis Beudin (March, 2016)

The case tests for an idealized vegetation patch along with a marsh face at the southern edge. Tests the effect of vegetation on the inducing momentum changes to hydrodynamics and wave-current interactions through feedback to and from SWAN. The presence of marsh is used to compute the effect of wave thrust on the marsh face.

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Reference:

“Development of a Coupled Wave-Current-Vegetation Interaction Model”, Alexis Beudin, Neil K. Ganju, John C. Warner and Tarandeep S. Kalra

USGS, Woods Hole Coastal and Marine Center, Woods Hole, MA

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This case is designed to test a vegetation patch located in the middle of a (10 x 10) km idealized case with 1 m depth. It has a sloping bathymetry varying from 1 m to 0 m across 10 kms.

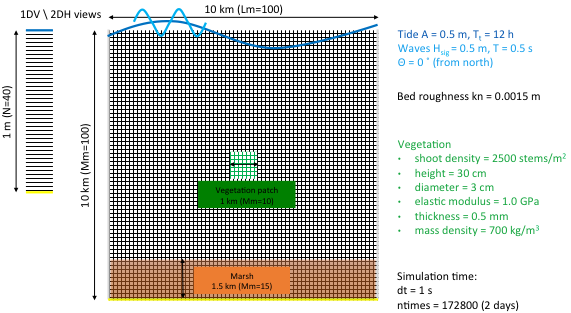
Number of points in horizontal directions = 100 x 100 points

Number of points in vertical = 40 points

A square patch of vegetation is located in the middle of the domain of size (1 x 1) km with 10 points spanning the vegetation patch in both horizontal directions.

The marsh is present across the entire Southern edge and extends to 1.5 kms North (15 points) from the Southern edge.

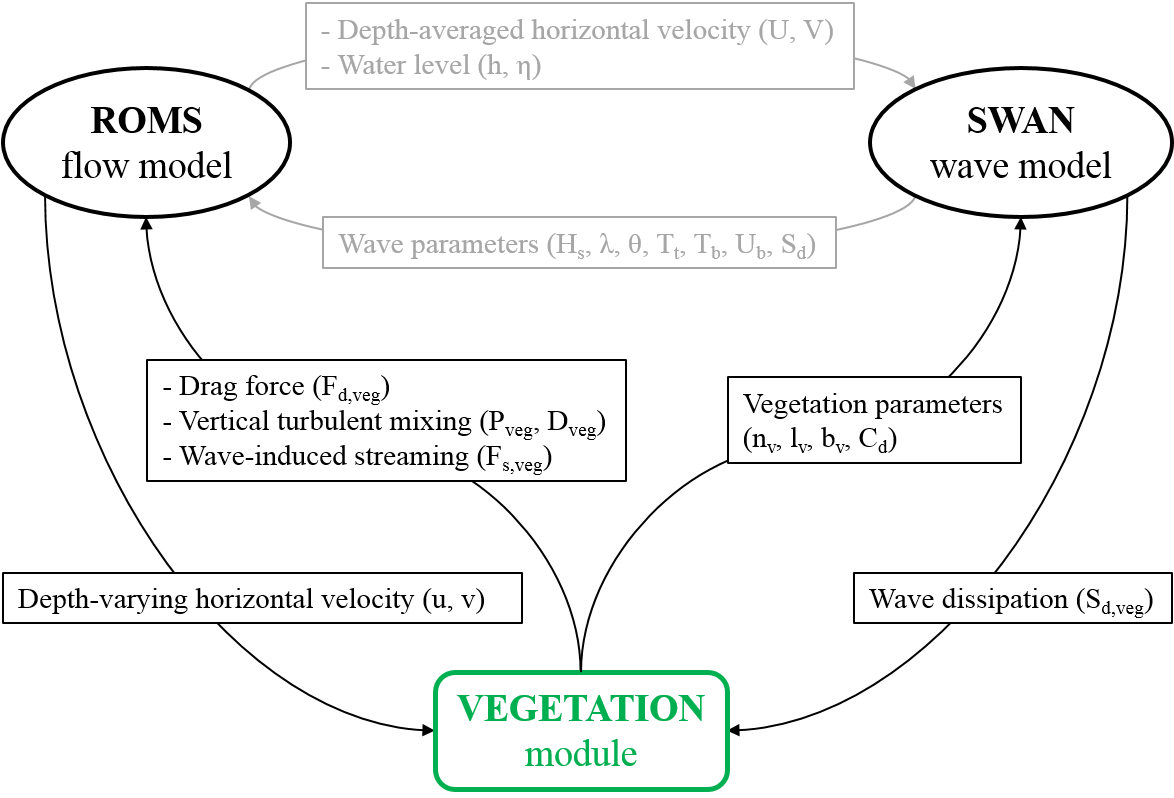
Schematic:



*Figure 1: Schematic showing vegetation and marsh domains*

**The case is currently setup to run with 24 processors.**

Coupling schematic from AB's paper:



*Figure 2: Diagram showing data exchanges between the flow model, the wave model, and the vegetation module in COAWST. (Beudin et al. 2016)*

**The case requires these ROMS+SWAN input files**

1. coupling\_veg\_test.in

2. "ocean\_veg\_test.in" ROMS input

-veg1\_init\_marsh.nc (ROMS input file)

3. "sediment\_veg\_test.in" ROMS sediment input (is not altered)

4. "swan\_veg\_test.in" SWAN input file

- square\_xygrid\_slope.nc

- swan\_bathy\_slope.bot

5. "vegetation.in" Vegetation input file

6. "ana\_fsobc.in"

**List of flags for the case**

*#define ROMS\_MODEL*

*#define SWAN\_MODEL*

*#define MCT\_LIB*

*#define UV\_VIS2*

*#define MIX\_S\_UV*

*#define MASKING*

*#define WET\_DRY*

*#define WET\_DRY\_LIMIT*

*#define UV\_ADV*

*#undef UV\_COR*

*#define TS\_MPDATA*

*#define DJ\_GRADPS*

*#define SOLVE3D*

*#define SPLINES*

*#define WEC\_VF*

*#define BOTTOM\_STREAMING*

*#define WDISS\_WAVEMOD*

*#define UV\_KIRBY*

*#undef ANA\_INITIAL*

*#define ANA\_FSOBC*

*#define ANA\_M2OBC*

*/\* define only one of the following \*/*

*#undef UV\_LOGDRAG*

*#define SSW\_BBL*

*#ifdef SSW\_BBL*

*# define SSW\_CALC\_ZNOT*

*#endif*

*#define VEGETATION*

*# ifdef VEGETATION*

*# undef ANA\_VEGETATION*

*# define VEG\_DRAG*

*# ifdef VEG\_DRAG*

*# undef VEG\_FLEX*

*# undef VEG\_TURB*

*# endif*

*# define VEG\_SWAN\_COUPLING*

*# ifdef VEG\_SWAN\_COUPLING*

*# define VEG\_STREAMING ! dependence to WEC\_VF/BOTTOM\_STREAMING*

*# endif*

*# define WAVE\_THRUST\_MARSH*

*# endif*

*#ifdef SOLVE3D*

*# define GLS\_MIXING*

*# ifdef GLS\_MIXING*

*# define KANTHA\_CLAYSON*

*# define N2S2\_HORAVG*

*# endif*

*# undef SEDIMENT*

*# ifdef SEDIMENT*

*# define SUSPLOAD*

*# undef BEDLOAD\_SOULSBY*

*# undef BEDLOAD\_MPM*

*# undef SED\_MORPH*

*# endif*

*# if defined SEDIMENT || defined SG\_BBL || defined MB\_BBL || defined SSW\_BBL*

*# undef ANA\_SEDIMENT*

*# endif*

*# define ANA\_SMFLUX*

*# define ANA\_STFLUX*

*# define ANA\_SSFLUX*

*# define ANA\_BPFLUX*

*# define ANA\_BTFLUX*

*# define ANA\_BSFLUX*

*# define ANA\_SPFLUX*

*# define ANA\_SRFLUX*

*#endif*

*#define DIAGNOSTICS\_UV*