Apply with WASP Water Quality Model

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Abstract—WASP(The water quality analysis simulation program) was recommended by EPA used as water quality model. It has been applied widely, It can simulate steady or unsteady water quality processes in such diverse water bodies as streams, lakes, reservoirs, estuaries. This paper introduced the compositions (DYNHYD, EUTRO, TOXI), and the transformations among 8 targets in EUTRO model, its applications in and aboard, and its develop mental prospects and directions in future.

Keywords- WASP, water quality simulation, apply

I. INTRODUCTION

The model studies natural water to influence to enter water in the nature or mankind's activity quality to change mathematics description of regulation with time and space. Involve hydrology, water power, water chemistry, water living creature, mathematics, and calculator... etc. several academincs knowledge, direct evaluate for fluid matter, estimate and pollution adjust to control with management provide basis[1].

WASP(The water quality analysis simulation program) is developed by the environmental protection bureau environment research laboratory in the United States nation, can use to imitate hydrology dynamics, river one dimension unsteady flow, lake and river mouth Be 3D unsteady to flow, normal regulations pollutant(include to fuse oxygen, living creature oxygen consumption and nourishment material and seaweed pollution) and poisonous pollutant(include organic chemistry material, metal and deposition thing the migration and conversion regulation in the water. The WASP fluid matter model mainly has three functions: describe fluid matter present condition, provide a general fluid matter estimate and provide particular position fluid matter estimate.

The edition of the most original WASP is release in 1983[2], it synthesized the concept that many other models uses, after several emendations, gradually become one of the models of the development maturity of USEPA WASPS and it one-time editions are all DOS procedures[3-4], but WASP6 development is under Window of procedure[5].Developing in 2005 can under the Windows2000 and the XP system the WASP7 editiones of movement.

WASP6 and WASP7s all have visual operation interface, circulating the speed is that 10 times that of the DOS edition in past is above[6].Their main characteristics are: Develop friendly customer's interface according to Windows; Including can convert born WASP can identify of processing data format; Have to efficiently enrich nourishment to turn and the processing mold of the organic pollutant piece;The result computing a result and actually measuring can directly carry on a curve comparison[7].

II. WASP MODEL

WASP includes two independent calculation procedures: DYNHYD and WASP. They can unite movement or independently circulate. DYNHYD is a hydrodynamic procedure, DYNHYD procedure with exercise equation and continuous equation[8] for foundation. WPSP imitates the sport and interaction of various pollutant in water. The way (x the y right angle sit to mark a broken line graph) that the WASP fluid matter model can output a result through a data form as well as pass sketch keeps a view to show the result that model circulates. WASP imitates procedure to constitute to2 from two statures procedures: poisonous chemistry thing model TOXI and rich nourishment turn model EUTRO.

TOXI mold piece: It can predict to fuse Tai and adsorb Tai chemistry the thing is in the variety circumstance in the river. The pollution of TOXI mold piece emulation poisonous material can consider 1~3 kinds of chemistry materials and 1~3 kinds of grain materials, including organic compound, metal and sediment etc. Can compute respectively to some pollution material, it fuses Tai and the density of grain Tai in water body, in the bottom mire hole water and the solid bottom density within mire[9].
EUTRO mold piece: Adopt rich nourishment of POTOMAC to turn the dynamics of model to combine WASP to move structure, the model imitated 8 normal regulations fluid matters index sign, can immediately predict DO, COD, BOD, rich the nourishment turn, carbon, chlorophyll a, ammonia, nitrate, organic nitrogen, positive phosphoric acid salt etc. material is in the variety circumstance in the river[10]. See Fig.1.

III. THE APPLICATION OF WASP MODEL

The operation method of WASP model is a river net first model to all turn, then carry on according to as follows 4 main steps: Water power studies, the quality deliver a research, fluid matter conversion research and environment poison the reason learn a research. Square one water power research wants to apply water power model procedure DYNHYD; Delivering of material in the second step research water current, depend show a drug research and the TOXI mold piece school of the fluid matter model procedure WASP check to complete; The third step research water current and the material conversion in the bottom quality, depend on laboratory research, the spot observation and experiment, parameter estimate, the model research combine together to complete, its model computes as a result want to verify; The end one step studies pollutant how influence environment[11].

IV. APPLIES WASP SOFTWARE[12]

The WASP software works window way one behavior the bottom pull menu, there is File, Pre-processor, Model, Post-processor, Help. The second behavior fast function presses button.
E. The pollutant parameter inputs

F. The performance of model

Model once acquiring a complete importation data, can start emulation, the window way will show each river segment, each change to measure the emulation in each time result. The network structure of the length and emulation river segment that imitates a process demand for time and change to measure of how much relevant.

V. WASP IS APPLIED

Since the 80's in 20th century, WASP model puts forward. Abroad, Thomann and Fitzpatrick give fluvial rich nourishment of horse to turn to carry on emulation to wave in the east of the United States; The volatility organic matter pollution of Ambrose to the east of the United States Delaware port carries on emulation. In China, Pang-Yong etc. [13] carried algae on Tai Lake to imitate a research and inquired into Tai Lake in the lake variety mechanism, to manage too there is certain realistic meaning in "algae"; Liao Zhen-Liang et. in Tong-ji university wait[14] WASP models carried on two developments and built up river fluid matter model in Suzhou, and make use of the model synthesizes to river environment in Suzhou whole cure engineering in relevant engineering and project carried on an emulation calculation; Yang Jia-Kuan waits[15] make use of WASP6 estimate south water north adjust behind the fluid matter of the segment of Xiang Fan, end of the movement result make people all more satisfied. DO in the Dong-Chang lake imitates a value and actually measures value of on the average opposite error margin only is 4.16%[16].See Fig 2.

VI. SUMMARIES

Pass to apply a solid example at home and abroad, the analysis actually measures value and emulation to be worth more curvilinear variety trend is very approach, basic request of emulation for matching model. Prove the model to have bigger rationality and credibility.

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