The flow vectors are very helpful for getting a feel for relative flow, and general direction.

The arrows’ size shows magnitude, and the arrows rotate as direction,

and can be presented with 1 arrow representing a single model cell or one arrow for some multiple, such as 5x5 or 10x10.

Magnitude is calculated as sqrt((sum of front face)^2+(sum of right face)^2) for the arrow size,

and flow direction is the resultant vector angle from arctan(sum of front face/sum of right face flow).

I also generally shade the individual cells with colors also showing magnitude, which emphasizes the relative arrows sizes and helps identify higher and lower areas of flow.

What these don’t show well is vertical flow, which can be shown as a separate map using a raster with a color ramp  symbolizing positive to negative values for up and down.

We’ve tried combining these maps, with color rasters showing vertical flow and arrows showing horizontal flow, but I’ve never found them to be as easy to understand as 2 separate maps.

Having just written the 1st paragraph, I realize this isn’t exactly the correct way to calculate magnitude of flow for a group of cells.

For instance if we consider a simplified case of 3x3 cells  that should show flow straight East at 30 cubic feet per stress period

Right Face Flow:

-10  -10  -10

-10  -10  -10

-10  -10  -10

Front Face Flow:

1. 0    0
2. 0    0
3. 0    0

**The method I had used would be:** sqrt((90^2)+(0^2)) = 90

**It makes better sense to do:**  sqrt(((90/9)\*3)^2+((0/9)\*3)) = 30

**That way if we had :**

Right Face Flow

-10  -10  -10

-10    -5   10

  -5    -5   10

=-35/9 =  3.888\* 3 =- 11.66

Front Face Flow:

1. 5    5
2. 6    6
3. 4    4

= 45/9 = 5 \* 3  = 15

**Where my old method would have been**

magnitude = sqrt(-35^2+45^2)= 57 cu feet/stress period  (three times the flow volume)

Direction = arctan(45/-35) = -52.12° or roughly NW (basically the same direction)

**The the better way:**

Magnitude = sqrt(136.0489 + 225) = 19.00129

Direction = acrtan (15/-11.66) = -52.14° or roughly NW at 19 cu-ft/stress period

atan2(15,-11.66)\*180/pi = 127.8591

**or Reverse direction to correct Modflow Flow budget terms**

atan(15/-11.66)\*180/pi = -52.14089 +180 = 127.8591

RF = c(-10,-10, 10, -10, -5, 10, -5, -5, 10)

FF = c(5, 5, 5, 6, 6, 6, 4, 4, 4)

Right Face Flow

-10  -10  -10

-10    -5   10

  -5    -5   10

Front Face Flow:

1. 5    5
2. 6    6
3. 4    4

mag = sqrt(RF^2+FF^2) and mean(mag)=9.8

11.180340 11.180340 11.180340

11.661904 7.810250 11.661904

6.403124 6.403124 10.770330

dir=atan2(FF,RF)\*180/pi

153.43495 153.43495 153.43495

149.03624 129.80557 30.96376

141.34019 141.34019 21.80141

Angles of direction (degrees) represent an arithmatic rotation style in ArcMap (degrees of counterclockwise rotation from East).