MINISTÉRIO DA CIÊNCIA E TECNOLOGIA
INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS

Introdução ao Geoprocessamento (SER-300)

Laboratório 5 – MÓDULO: GEOESTATÍSTICA LINEAR

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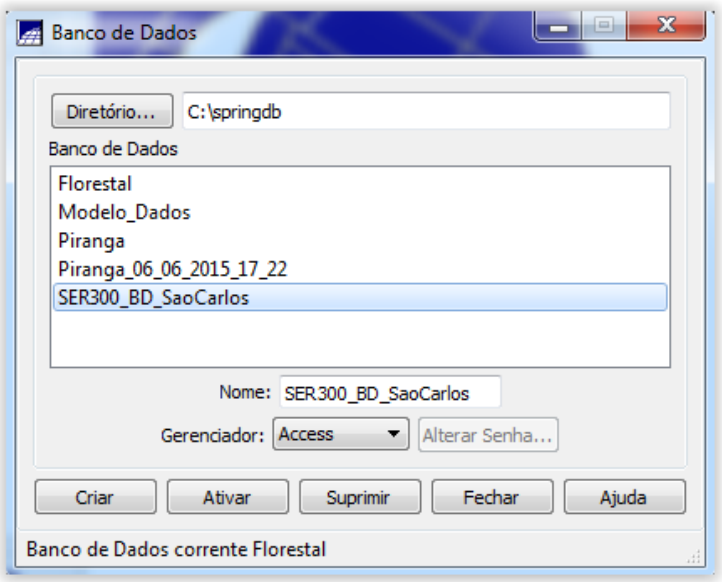
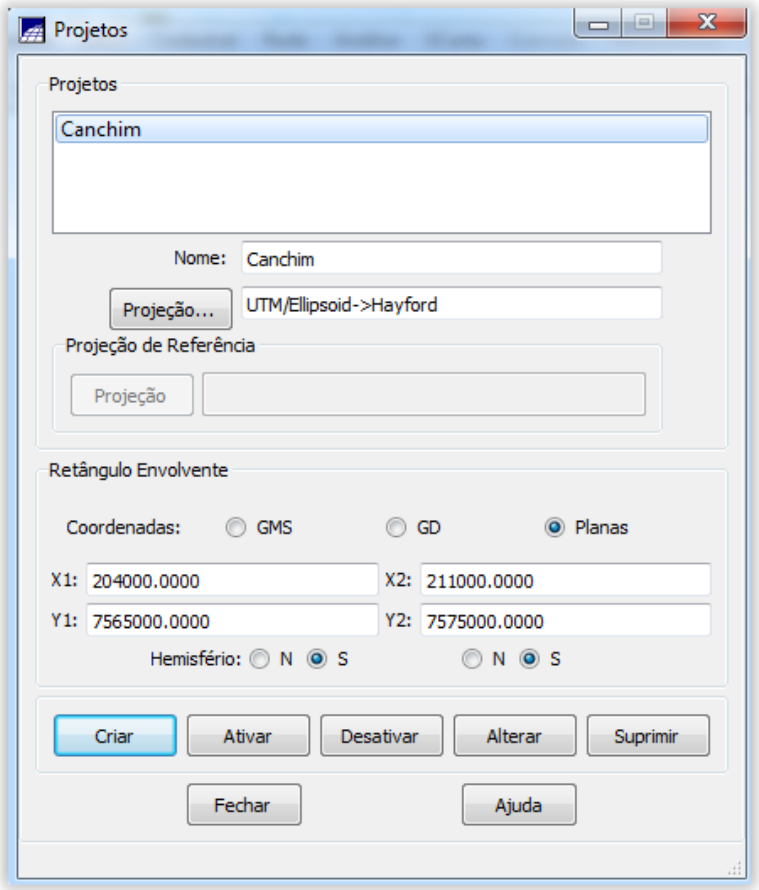
INPE
São José dos Campos
2015

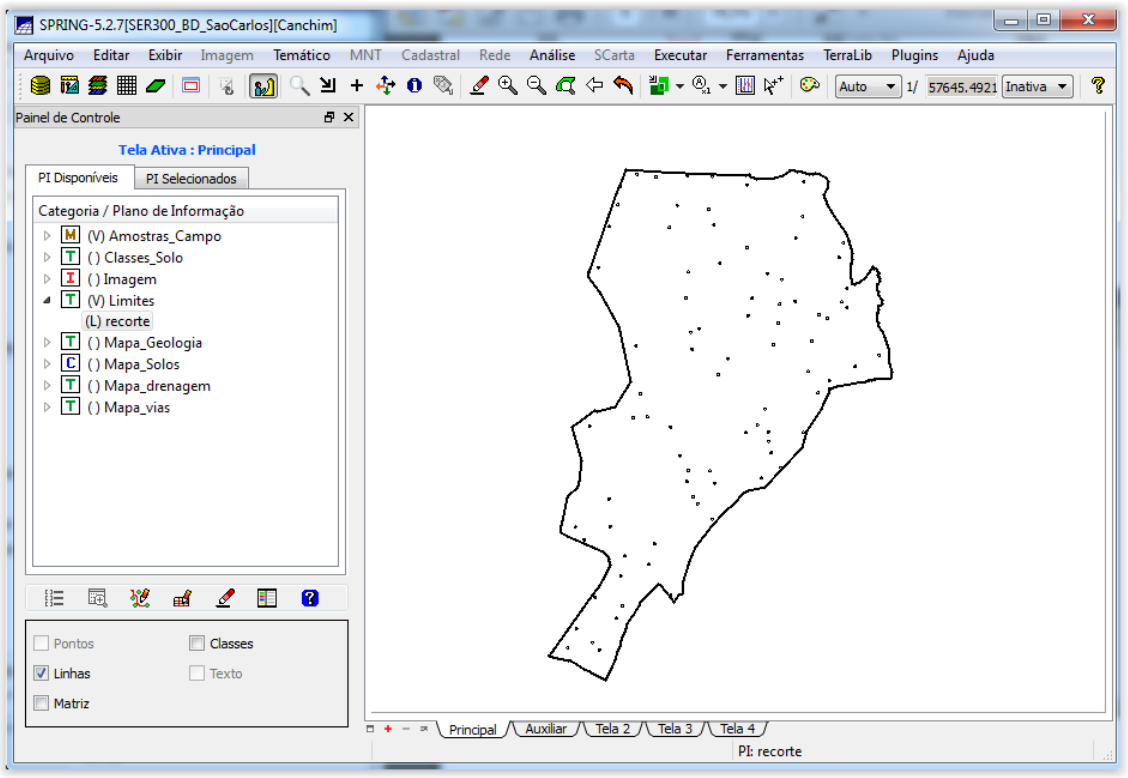
Exercício 1 – Carregar os dados no sistema SPRING

Ativando o banco de dados:



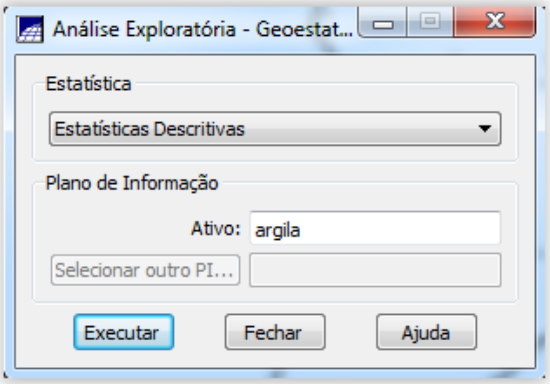
Ativando o projeto:

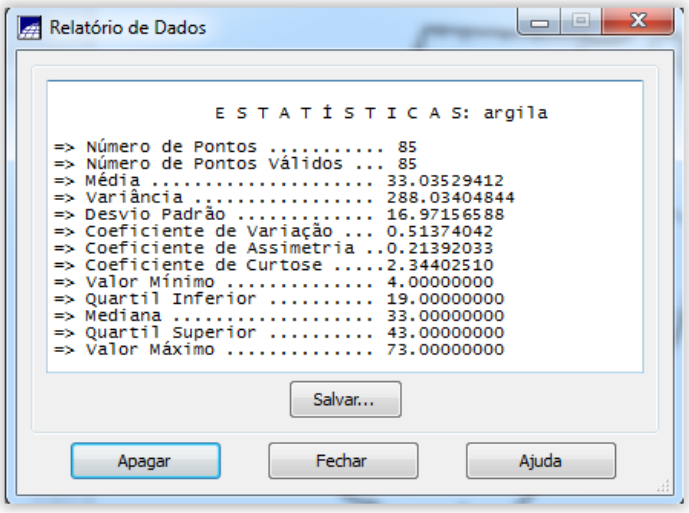




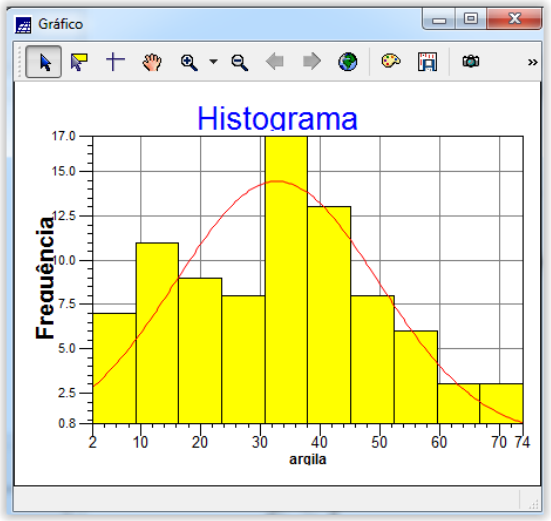
Exercício 2 – Inicializando a análise exploratória no sistema SPRING

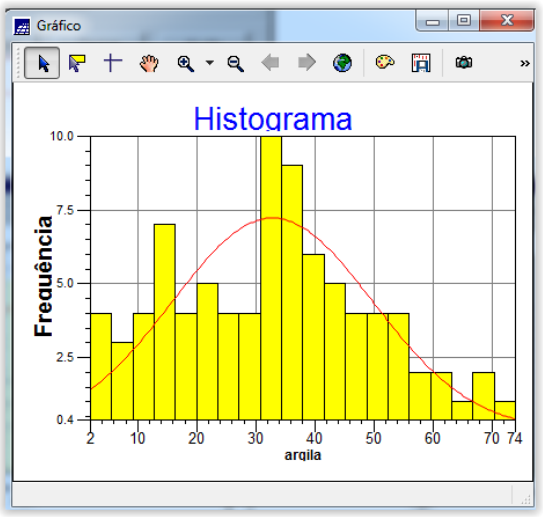
Executando estatísticas descritivas:



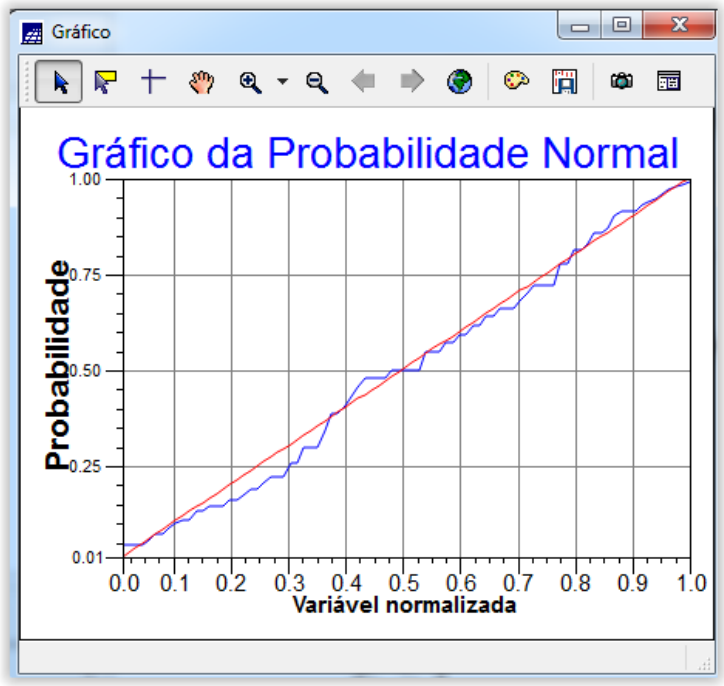


Executando histograma: (10 e 20 classes)

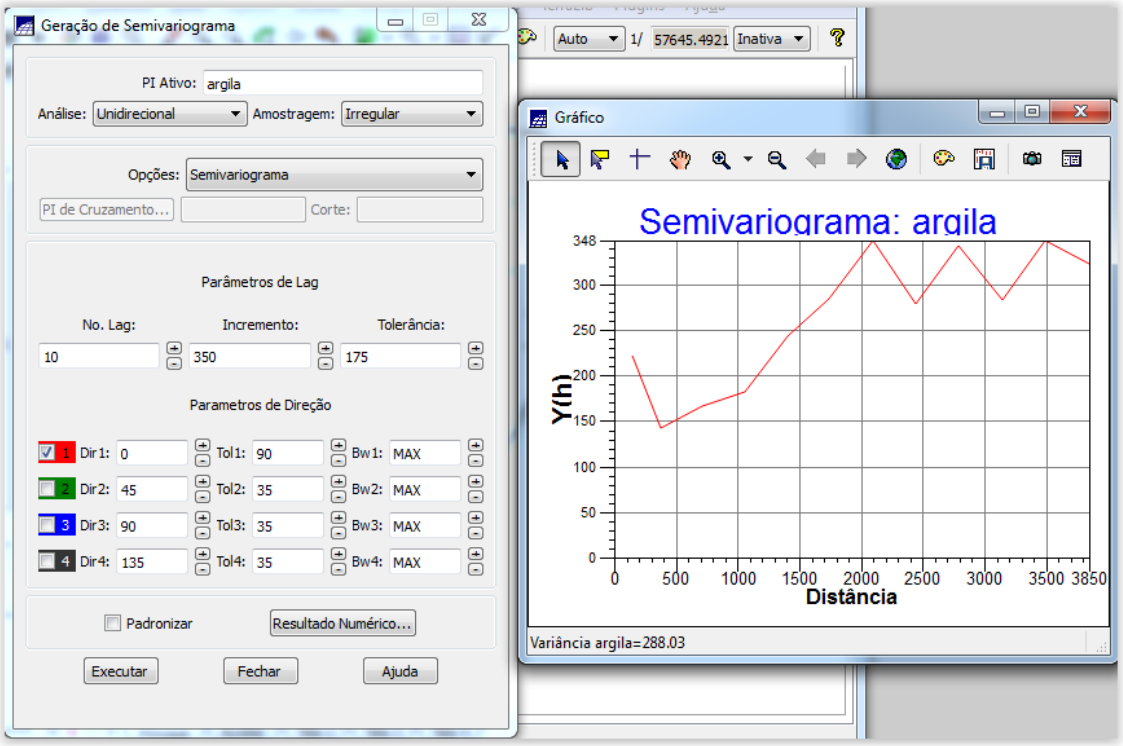




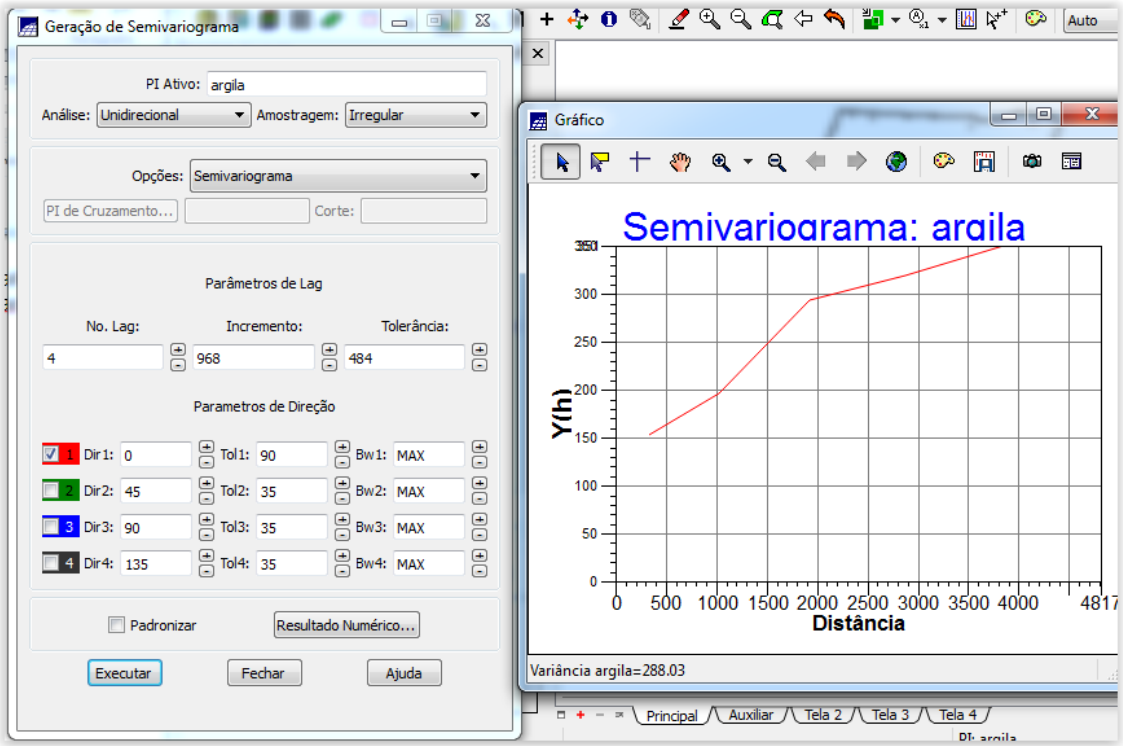
Executando o gráfico da probabilidade normal:
Em azul temos a argila e, em vermelho, a distribuição gaussiana.



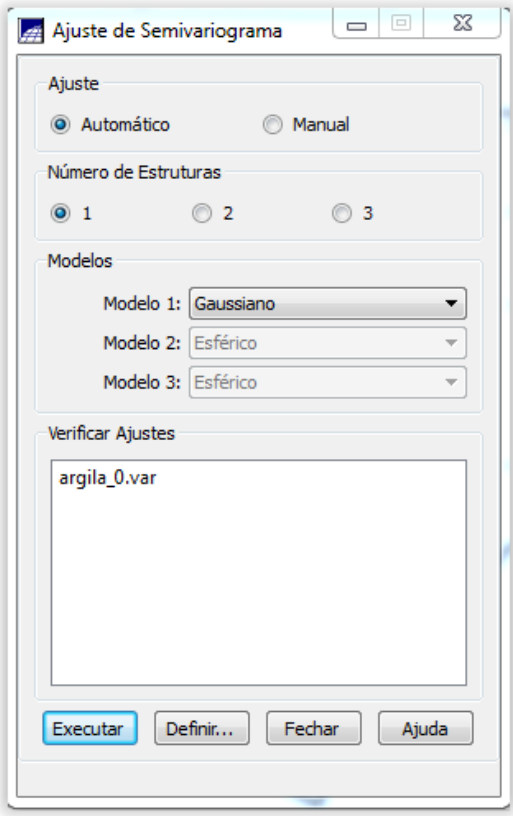
Exercício 3 – Caso isotrópico – Análise da variabilidade espacial por semivariograma

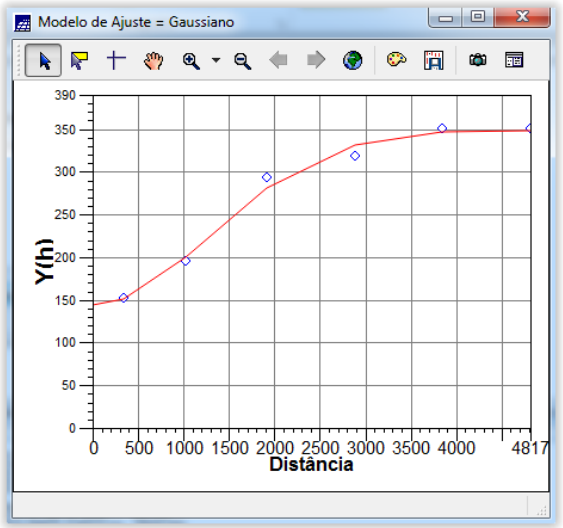


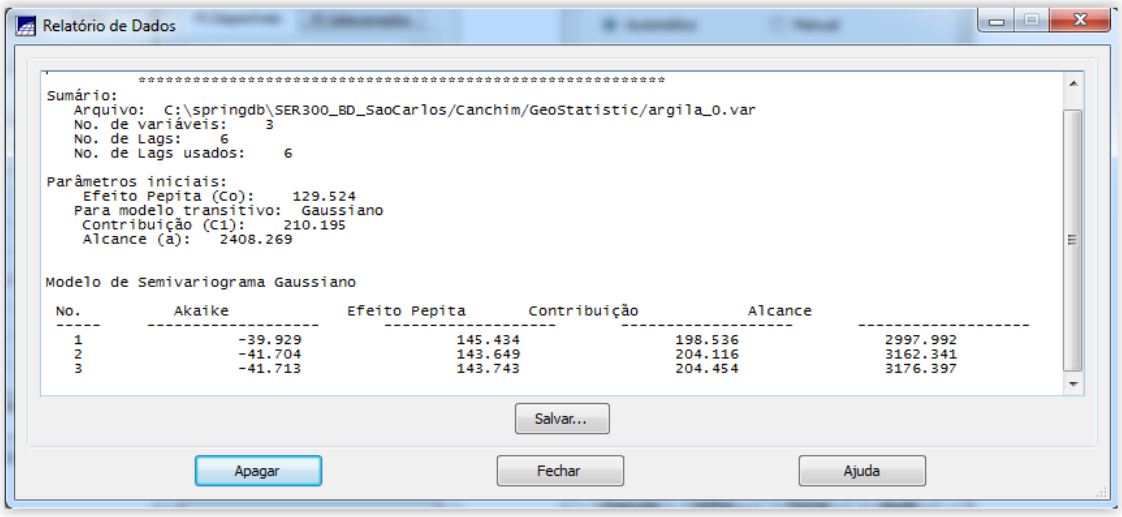
Podemos alterar os parâmetros de Lag para melhorar a forma do semivariograma e aproximá-lo a um semivariograma ideal:



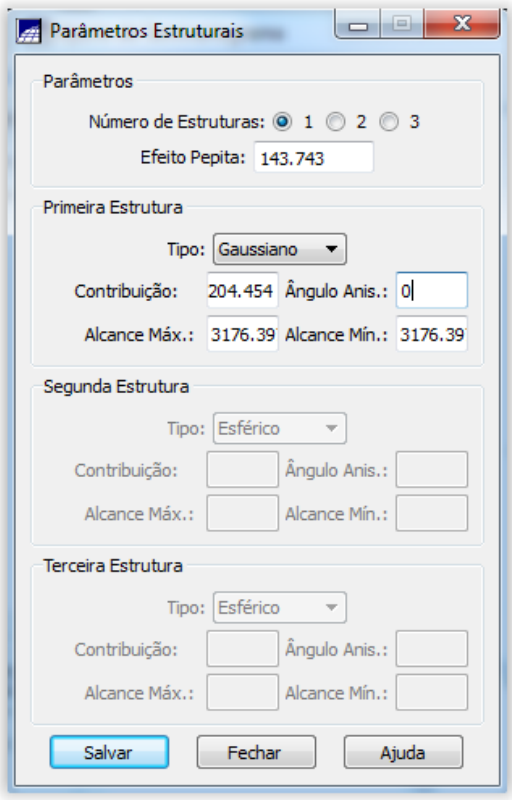
Exercício 4 – Modelagem do semivariograma experimental

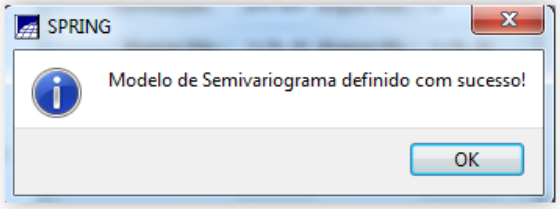






Definindo os parâmetros do modelo isotrópico:





Exercício 5 – Validação do modelo de ajuste

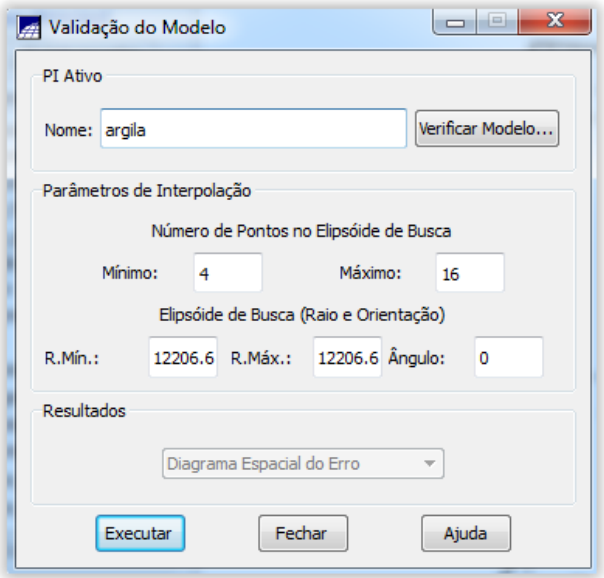
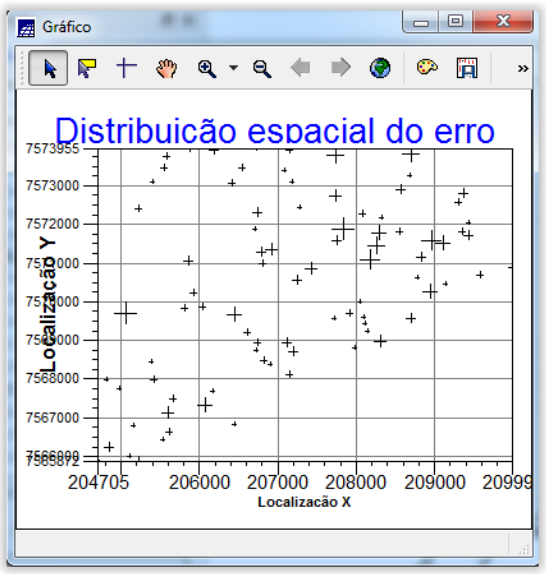
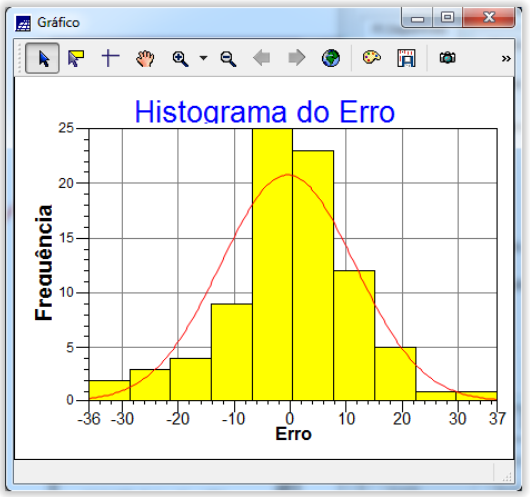


Diagrama espacial do erro:



Histograma do erro:



Estatísticas do erro:

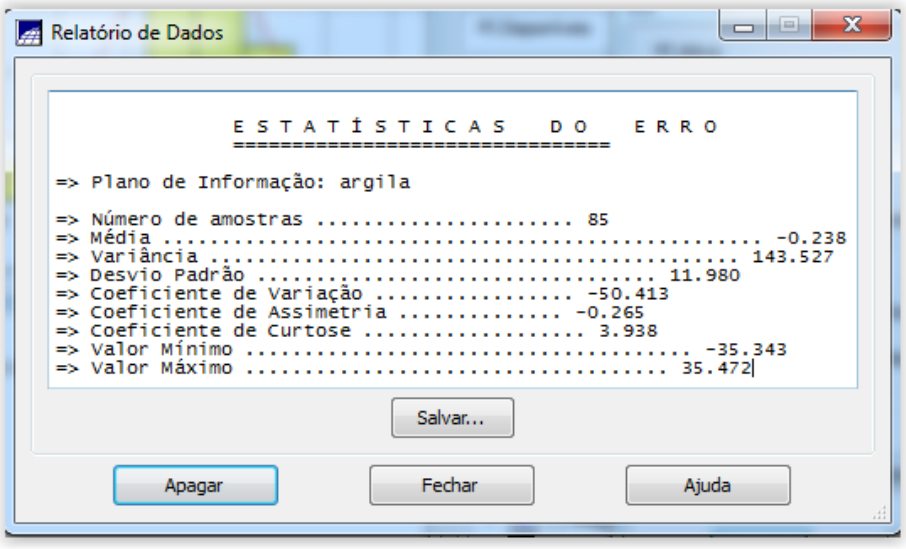
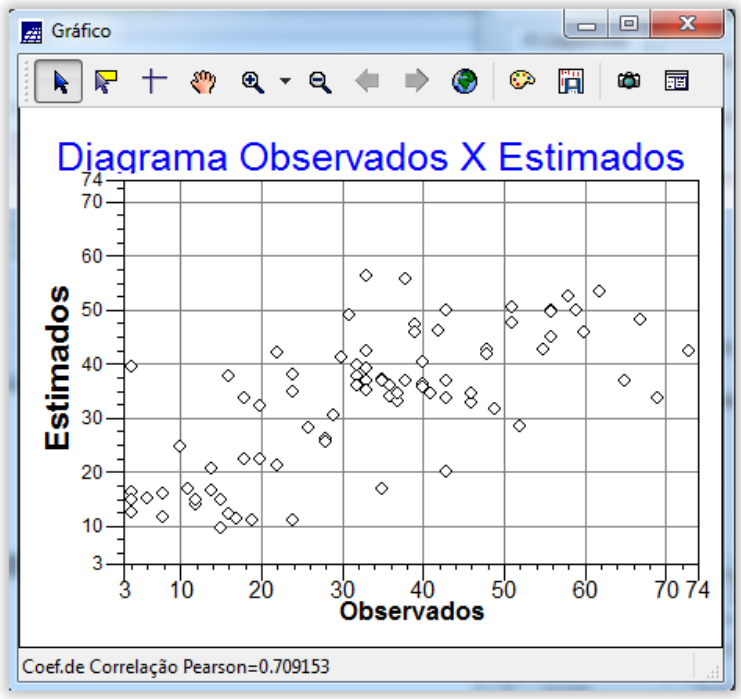
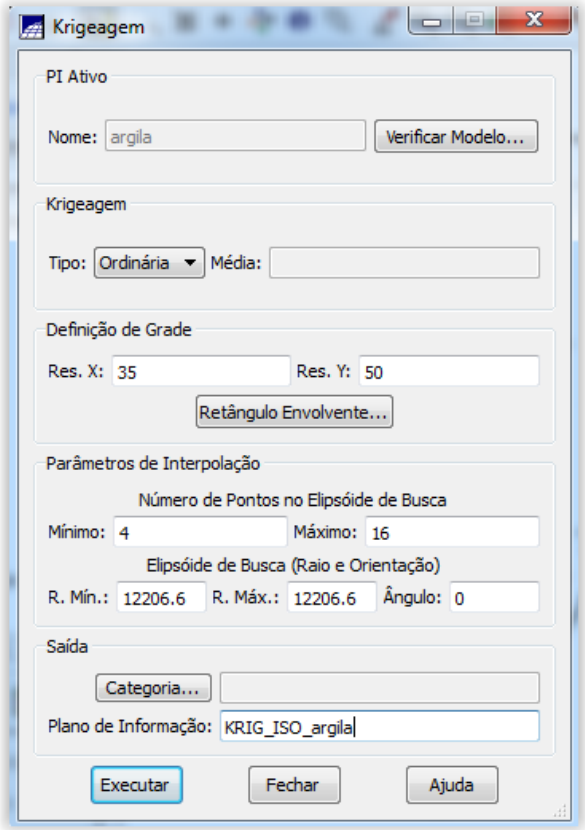
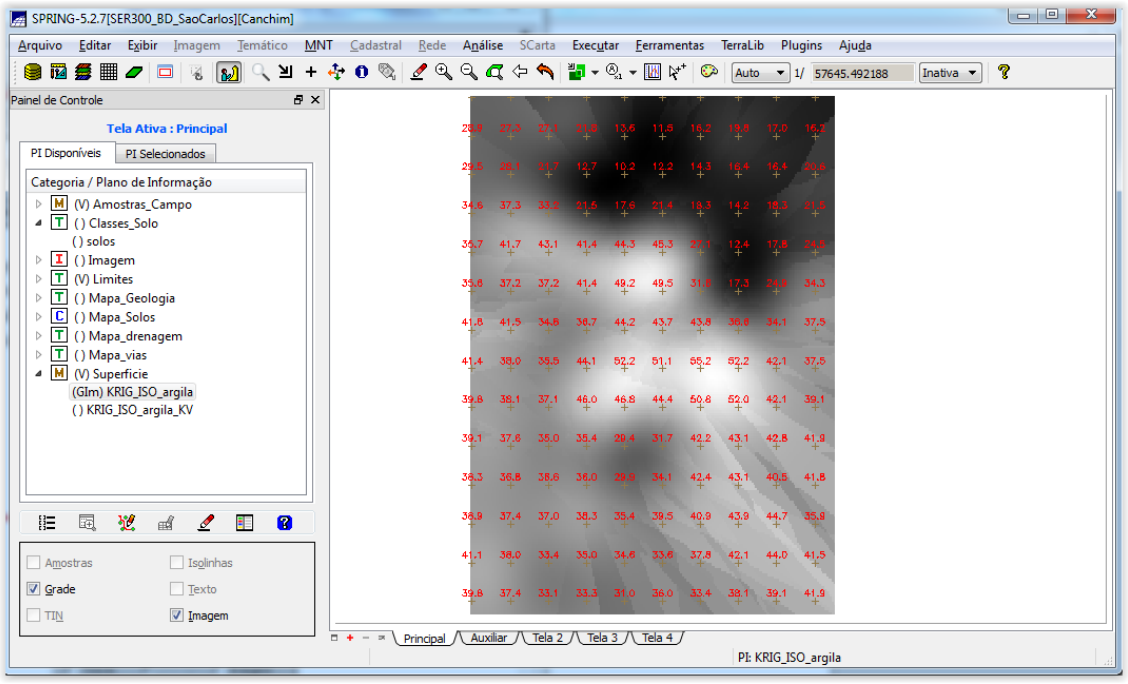


Diagrama de valores observados versus estimados:

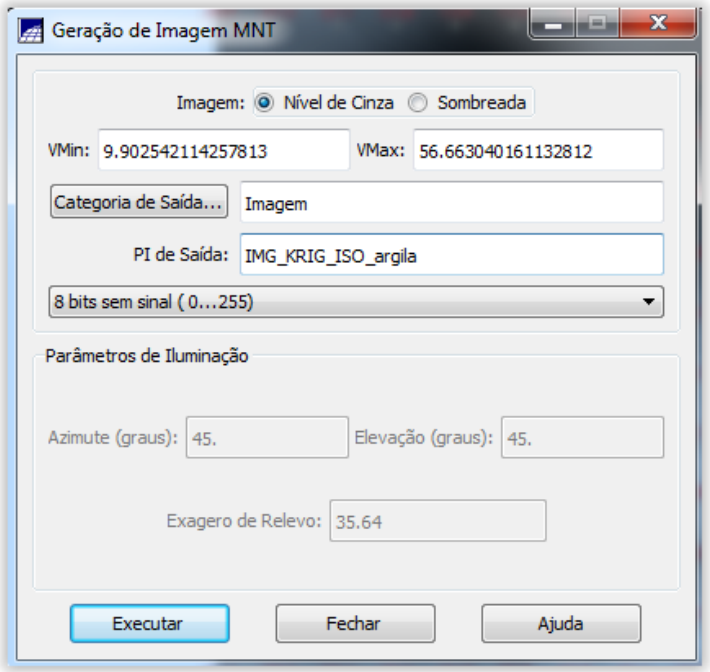


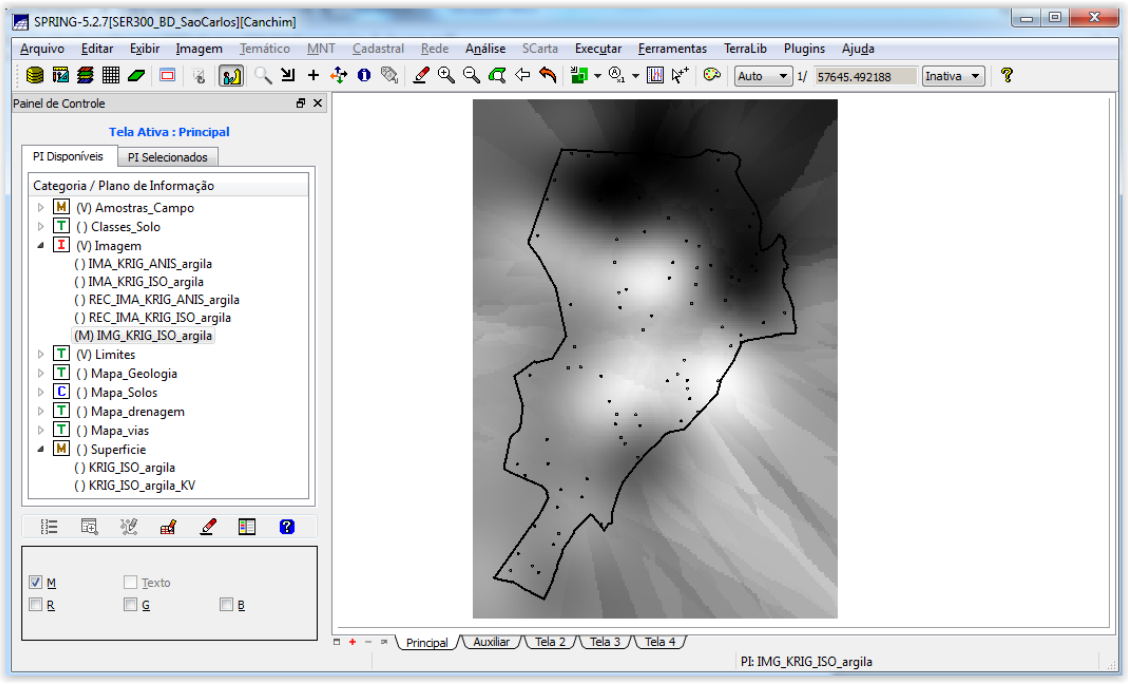
Exercício 6 – Interpolação por krigeagem ordinária



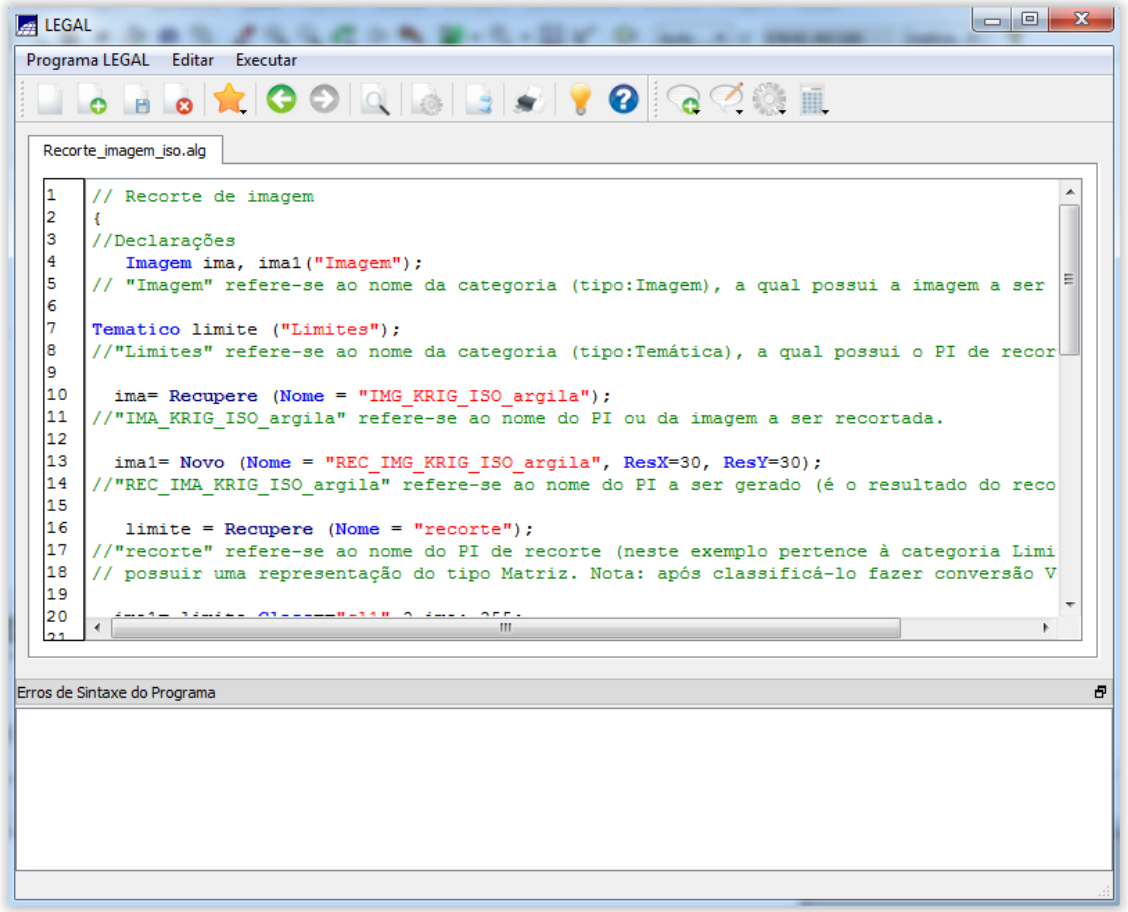


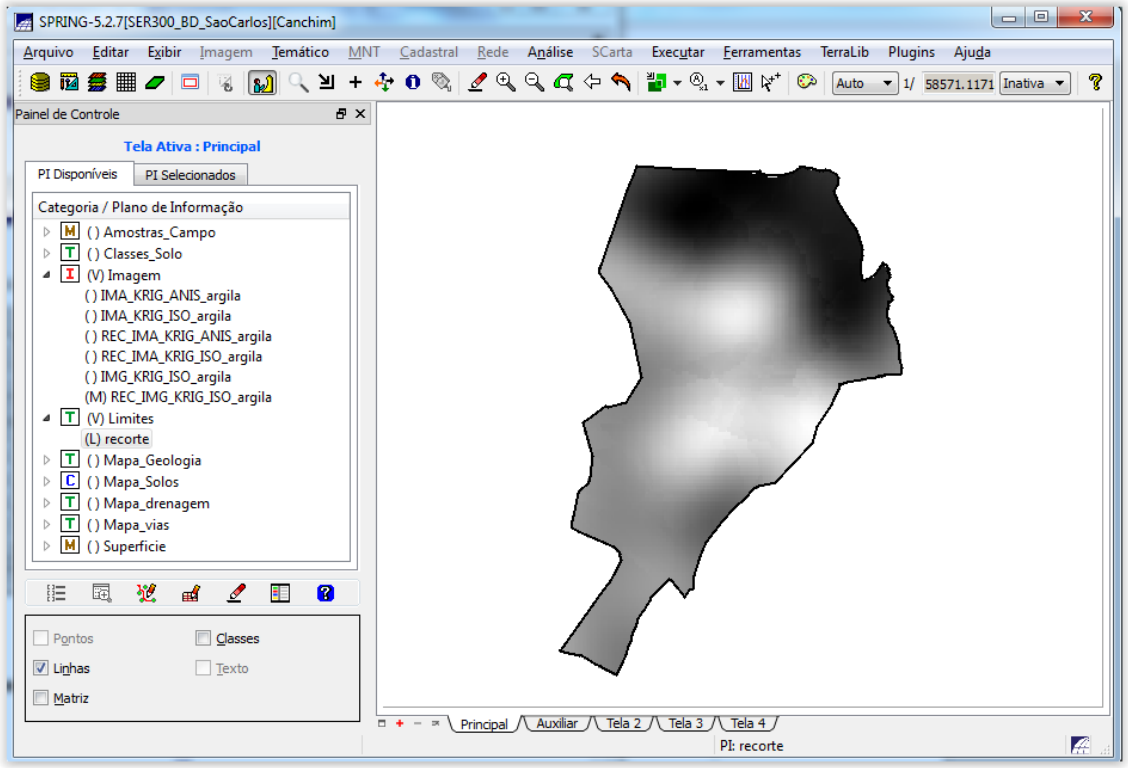
Exercício 7 – Visualização da Superfície de Argila



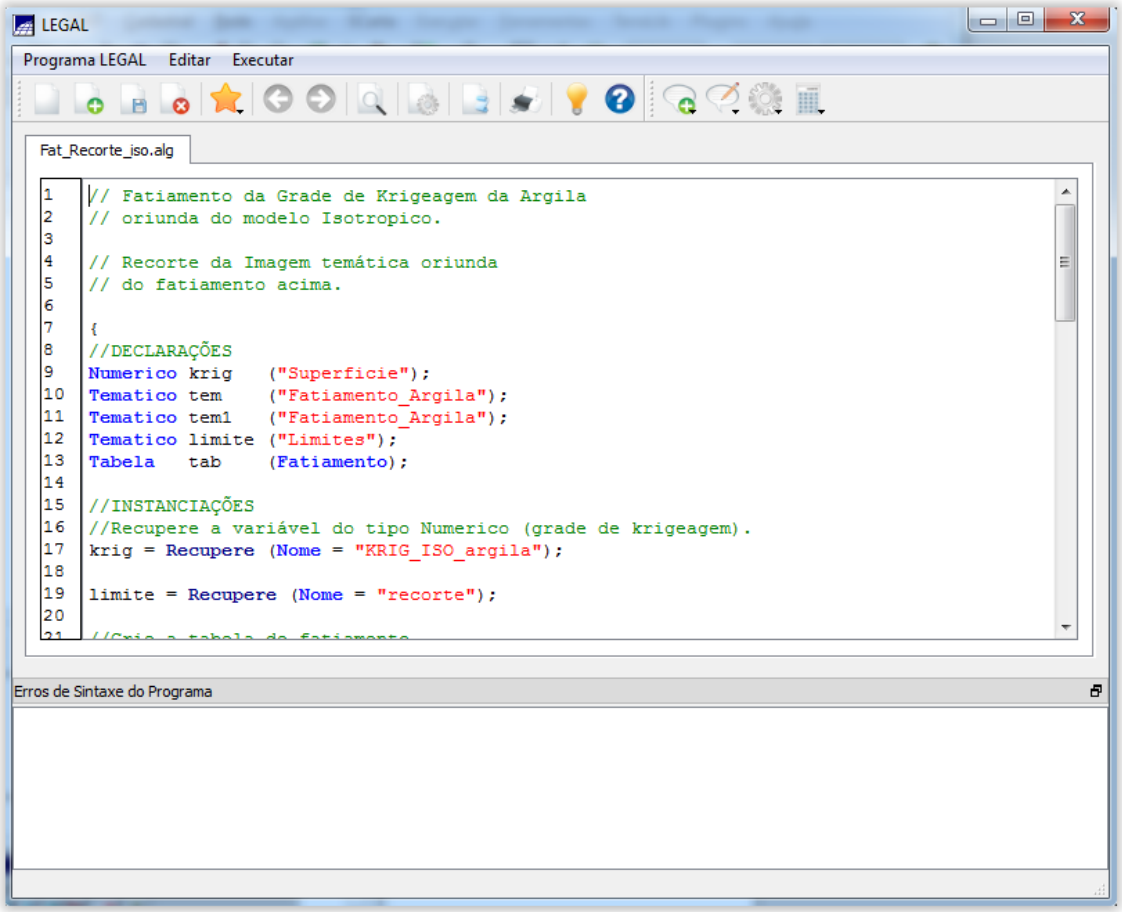


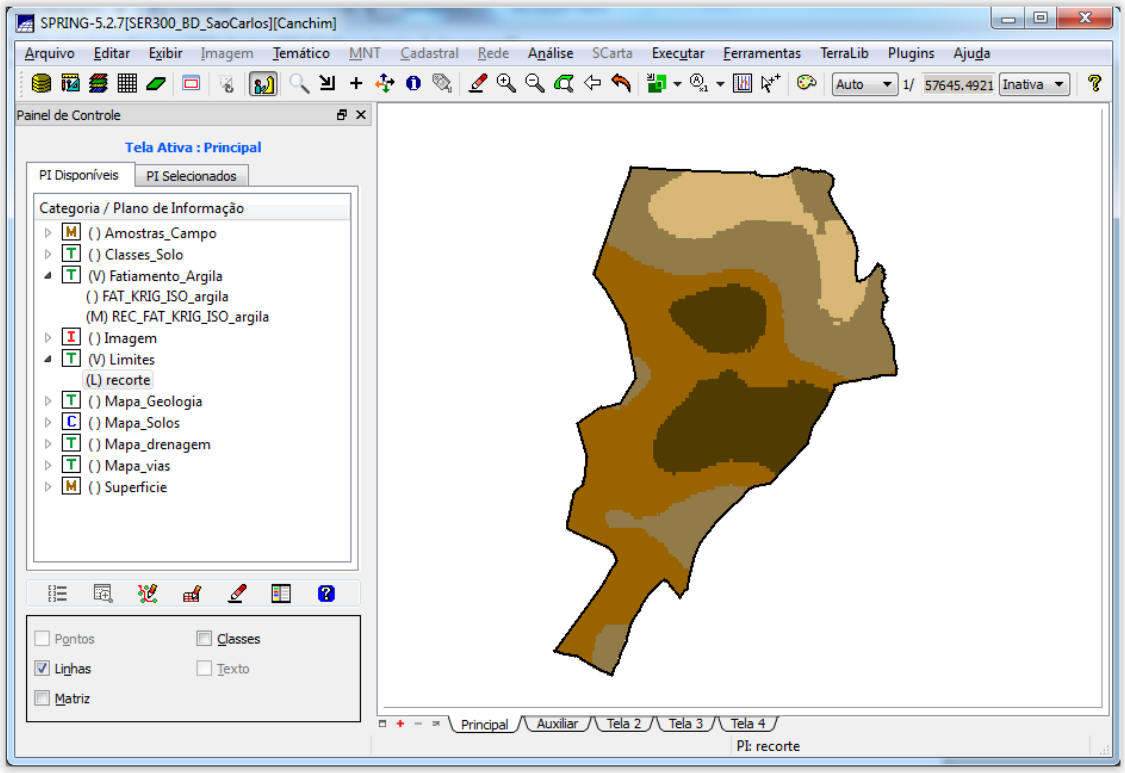
Executando recorte da imagem gerada utilizando LEGAL:



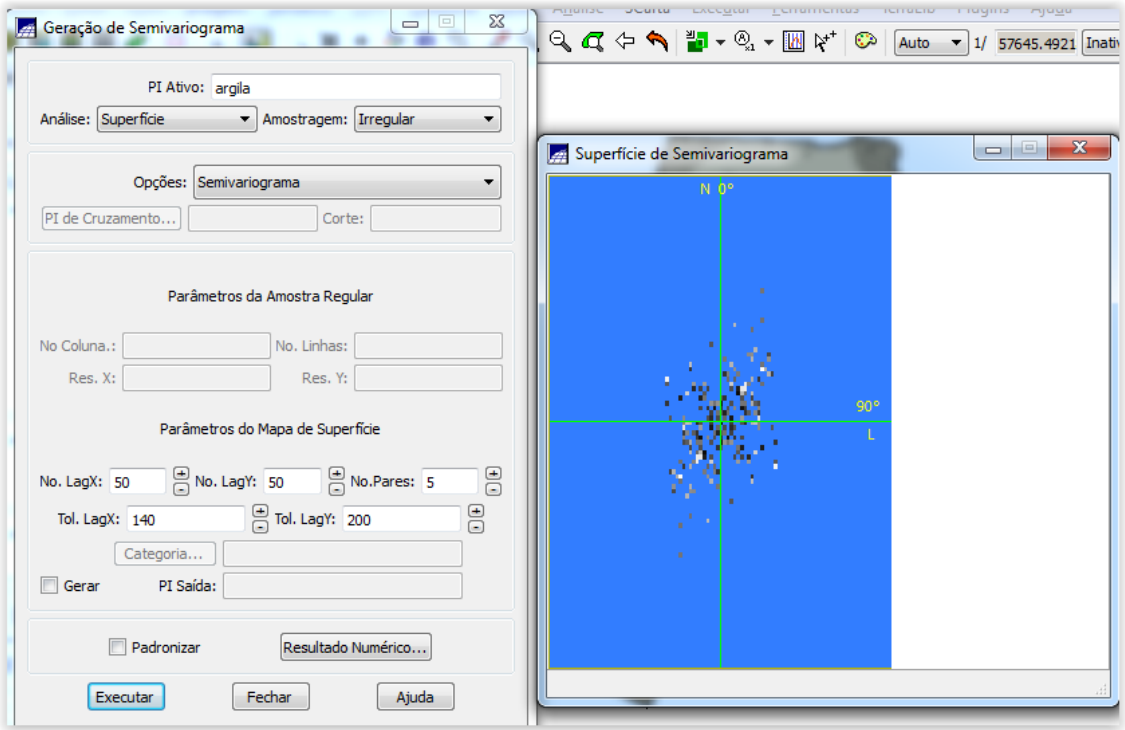


Executando fatiamento e recorte da grade de teor de argila:

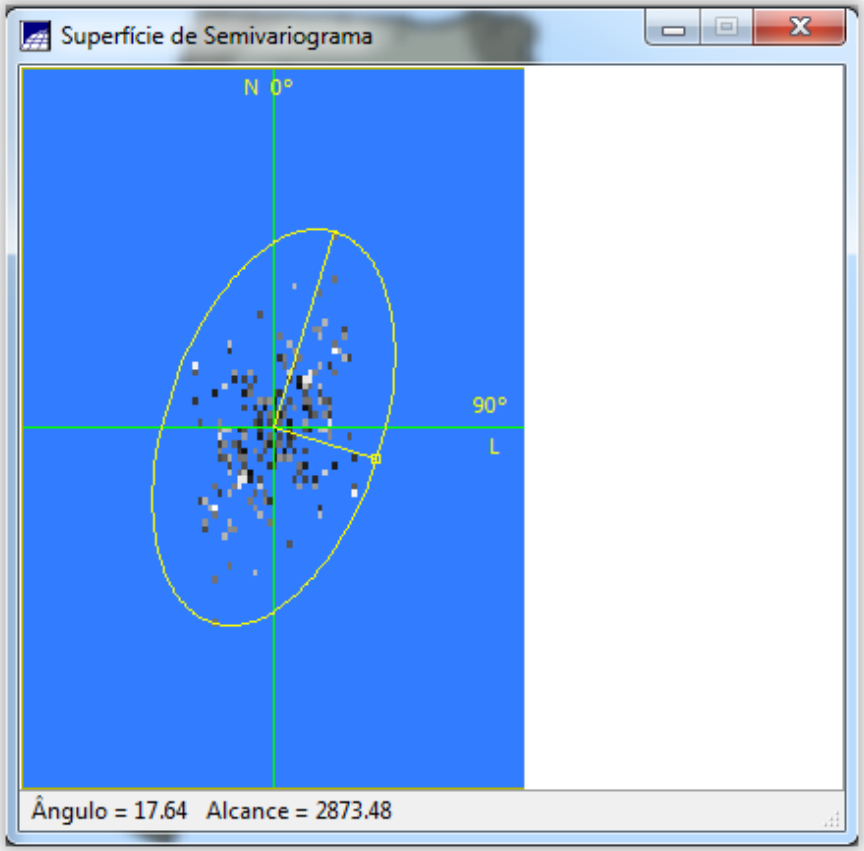


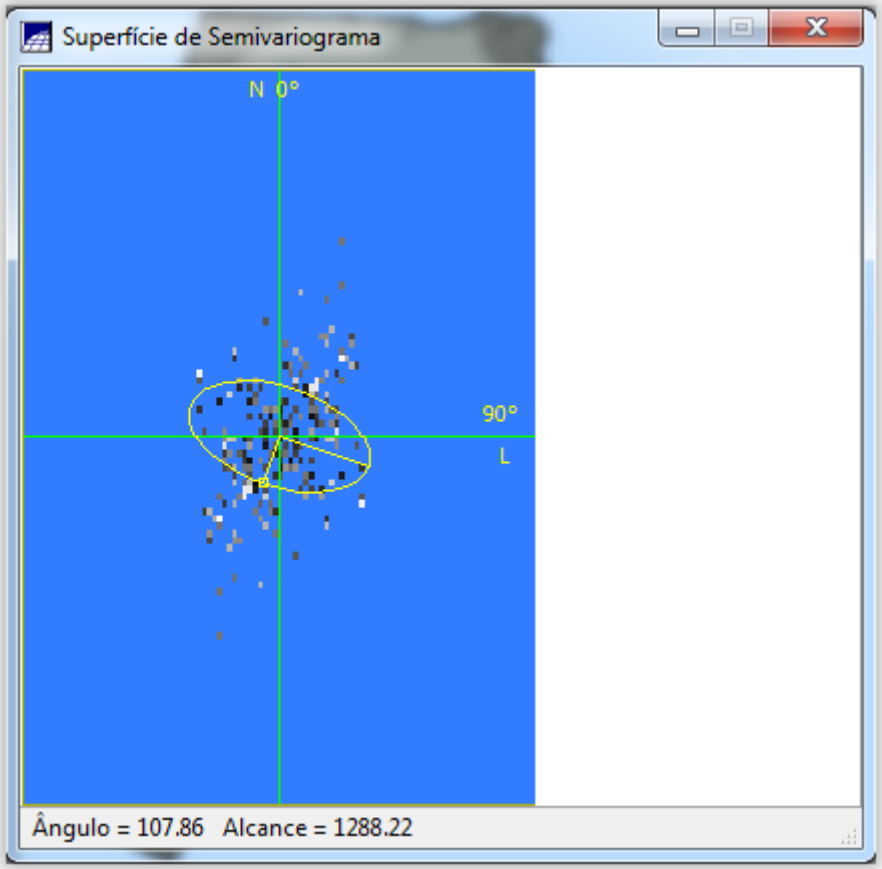


Exercício 8 – Caso Anisotrópico – detecção da anisotropia:

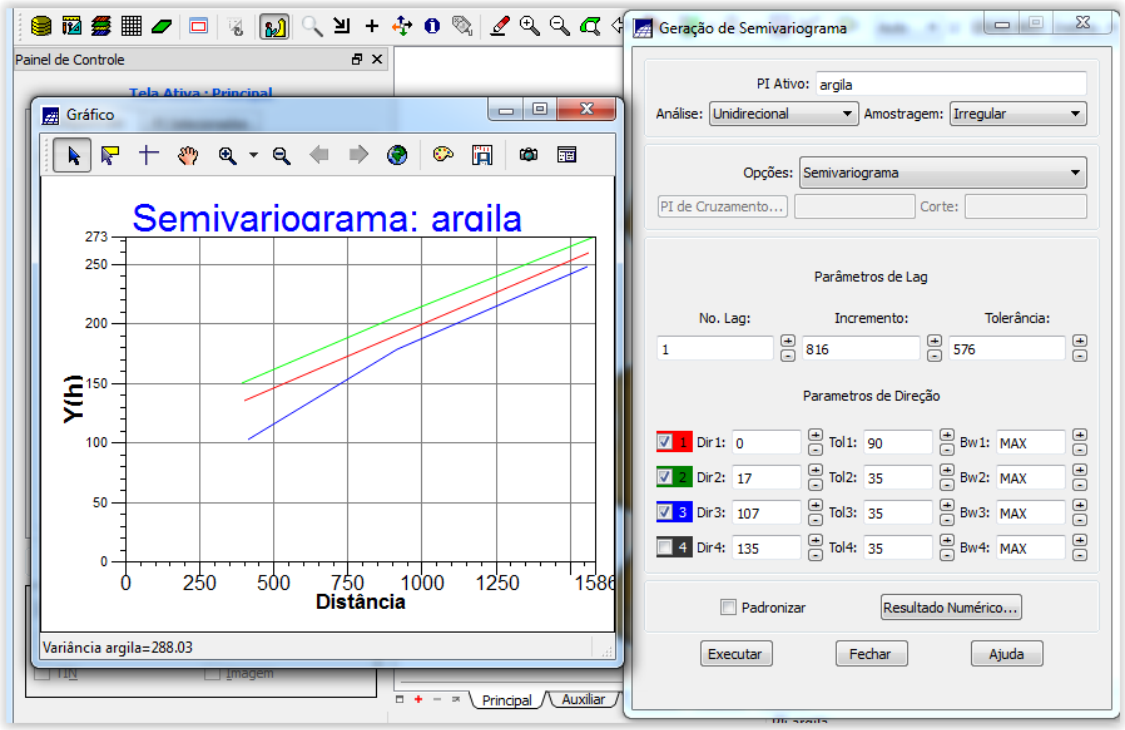


Detecção dos eixos de anisotropia:


Superfície de Semivariograma
N 0°
90°
L
Ângulo = 17.64 Alcance = 2873.48

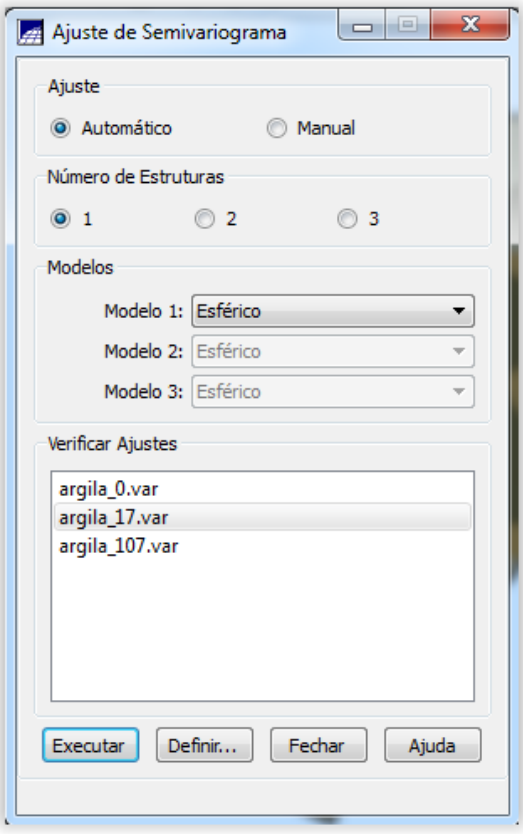

Superfície de Semivariograma
N 0°
90°
L
Ângulo = 107.86 Alcance = 1288.22

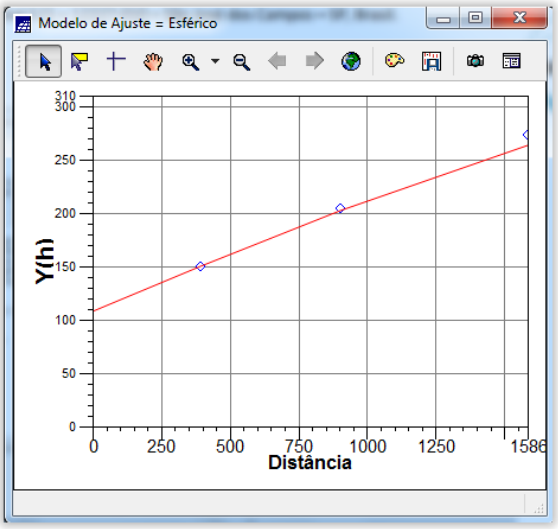
Exercício 9 – Geração dos semivariogramas direcionais

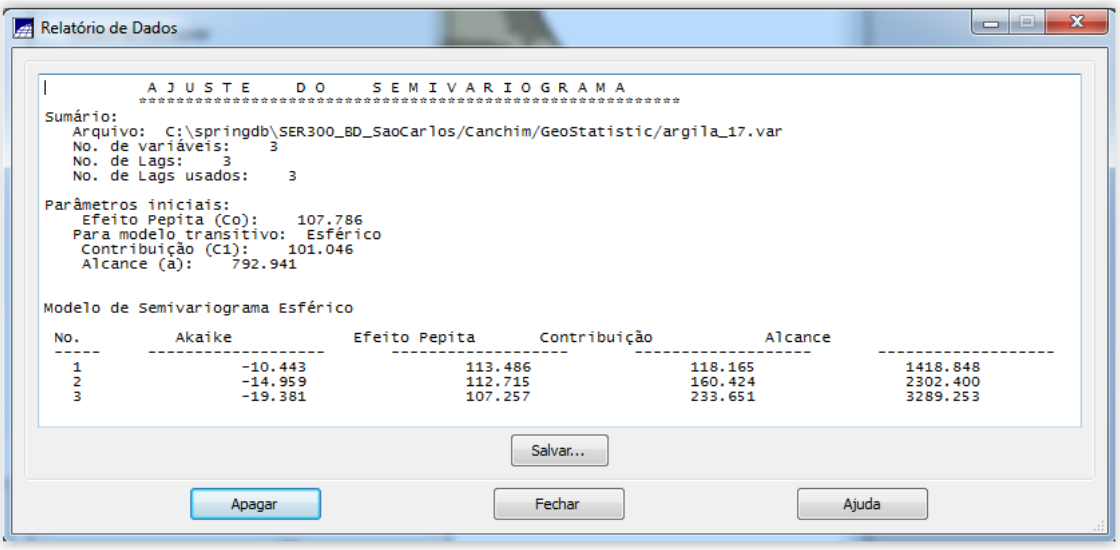


Exercício 10 – Modelagem dos semivariogramas direcionais

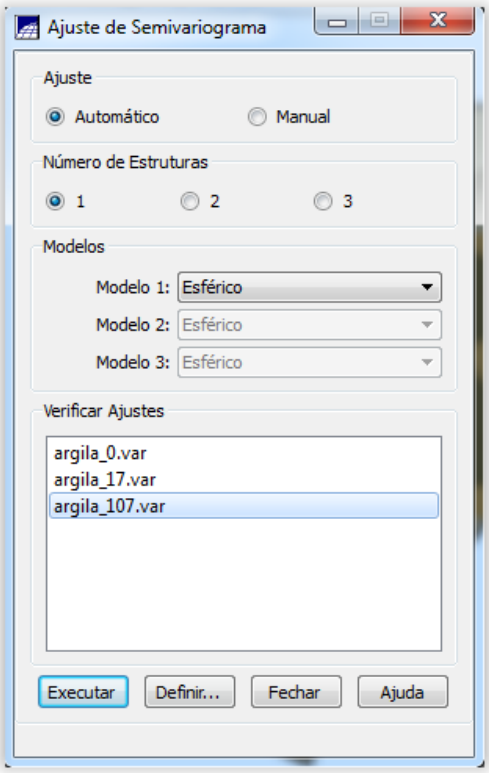
Para a direção de maior continuidade (17º):

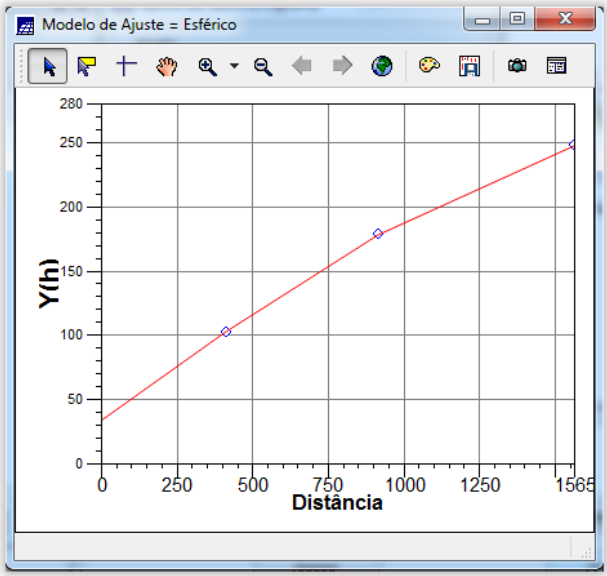


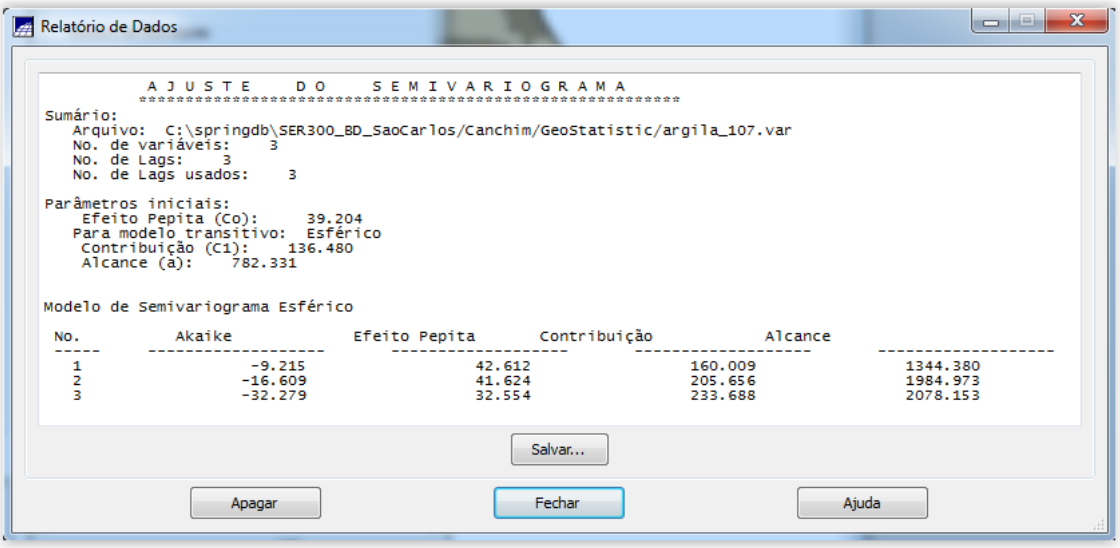




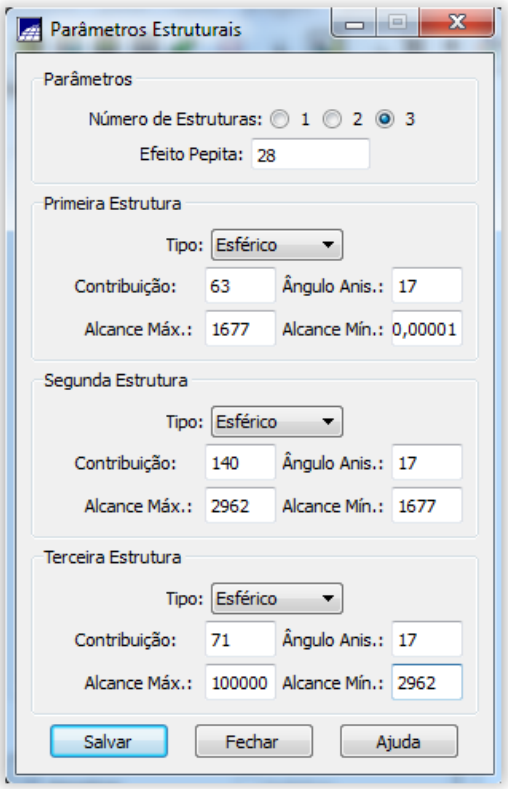
Para a direção de menor continuidade (107º):

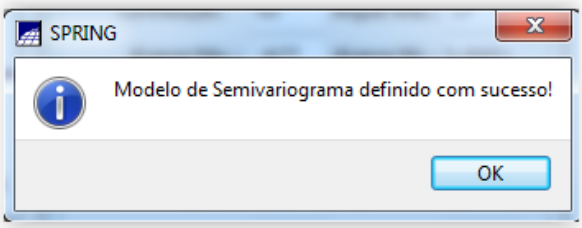






Exercício 11 – Modelagem da anisotropia





Exercício 12 – Validação do modelo de ajuste

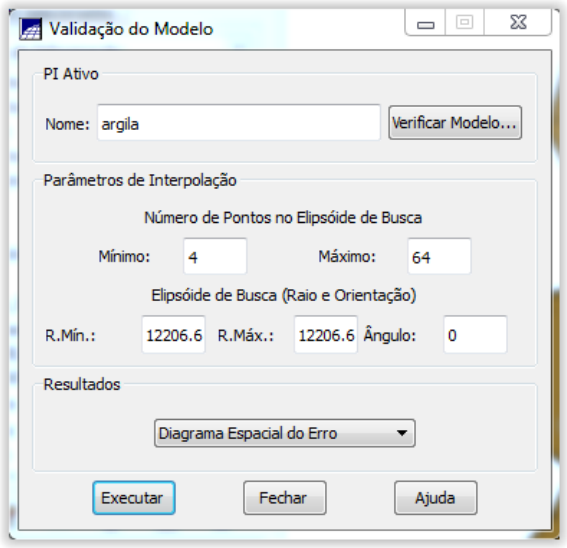
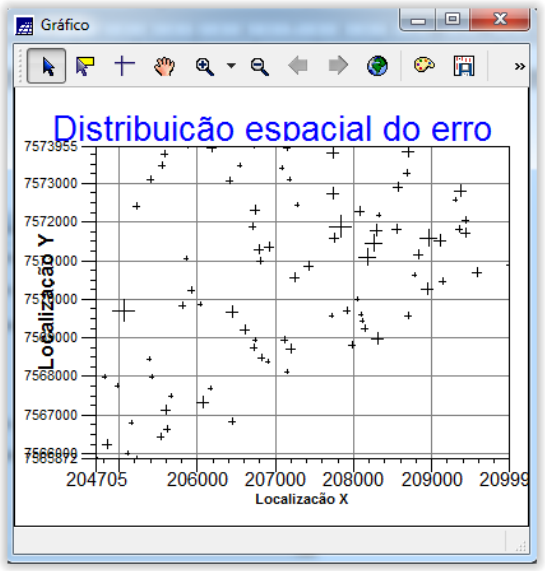
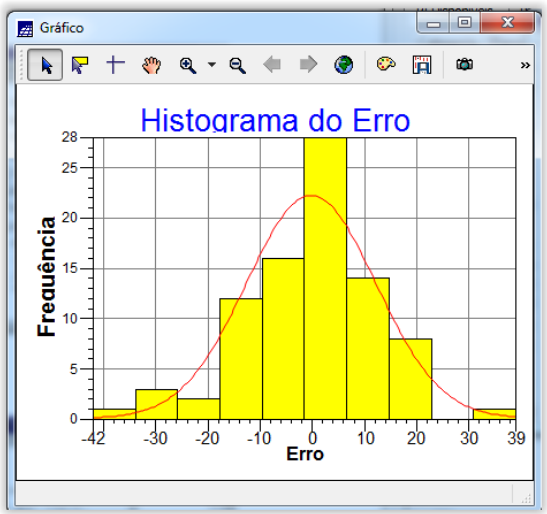


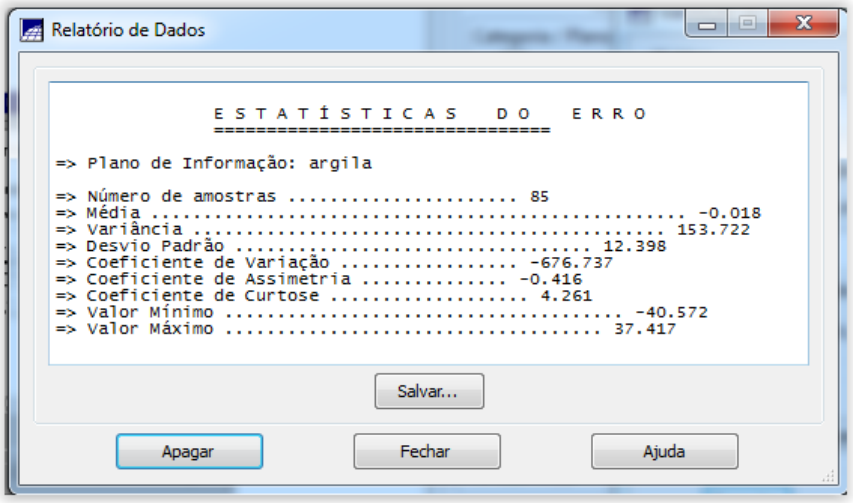
Diagrama espacial do erro:



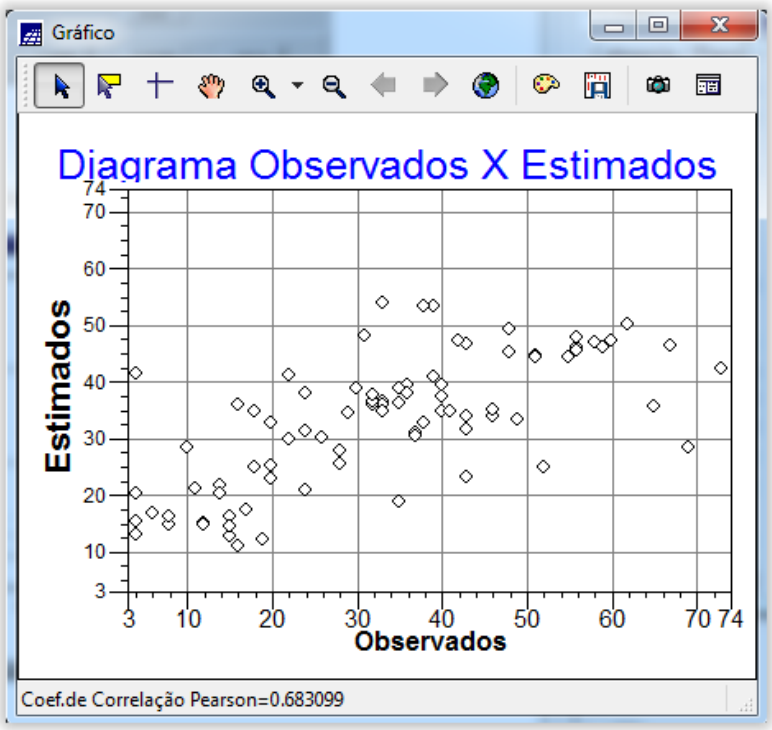
Histograma do erro:



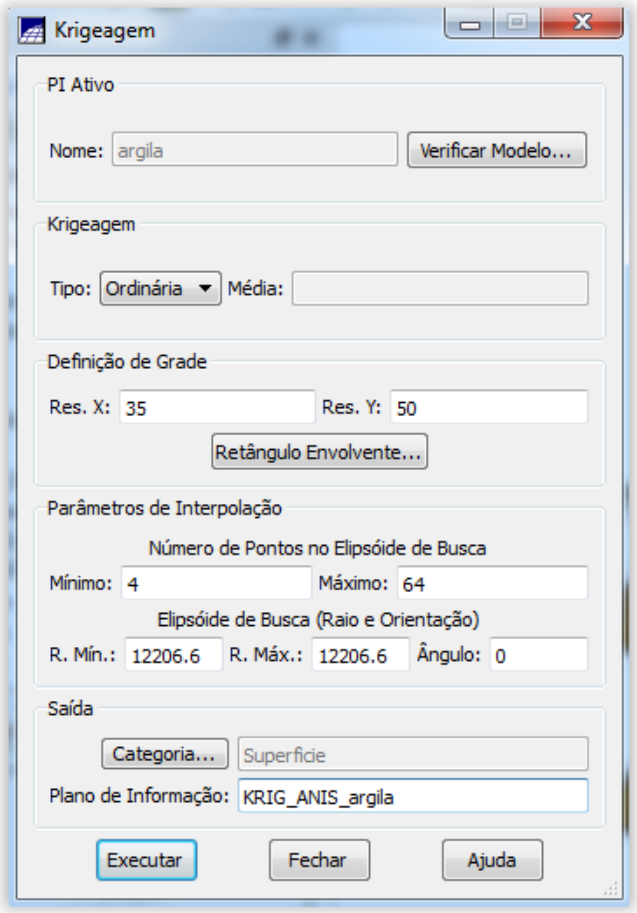
Estatísticas do erro:

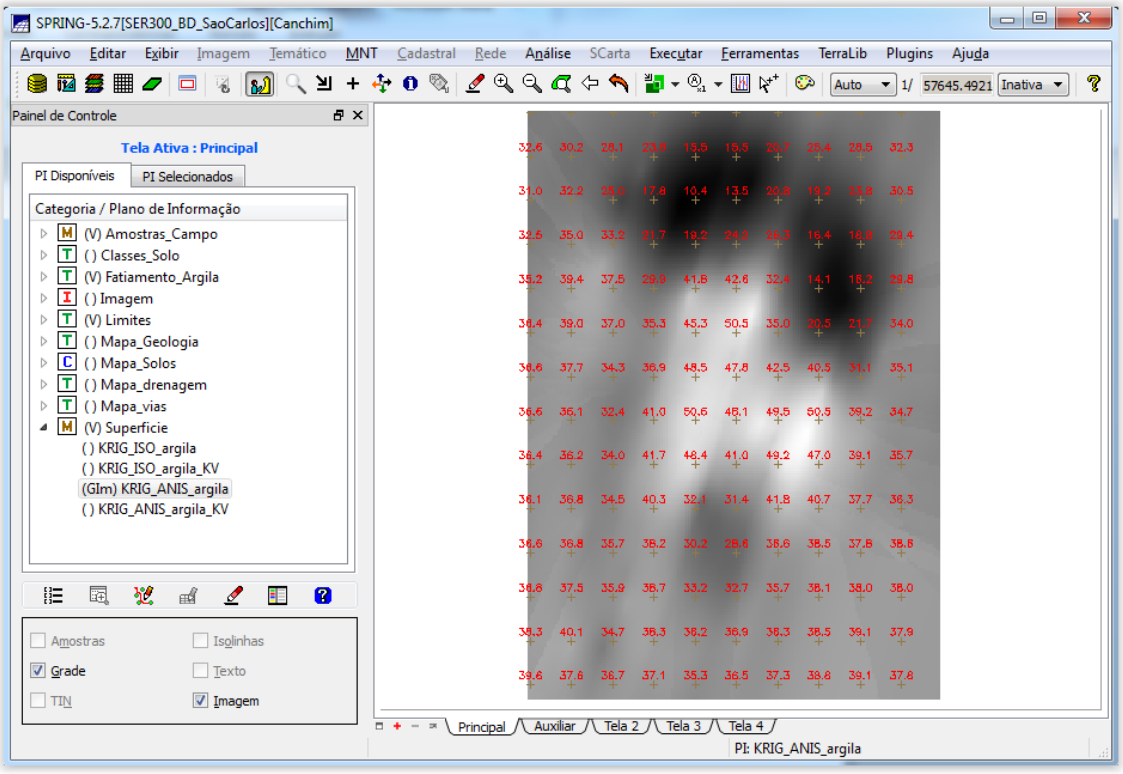


Diagramas de valores observados versus estimados:

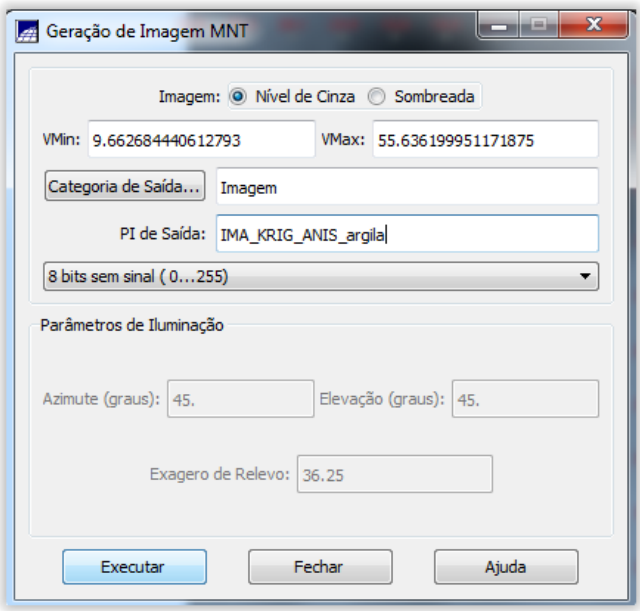


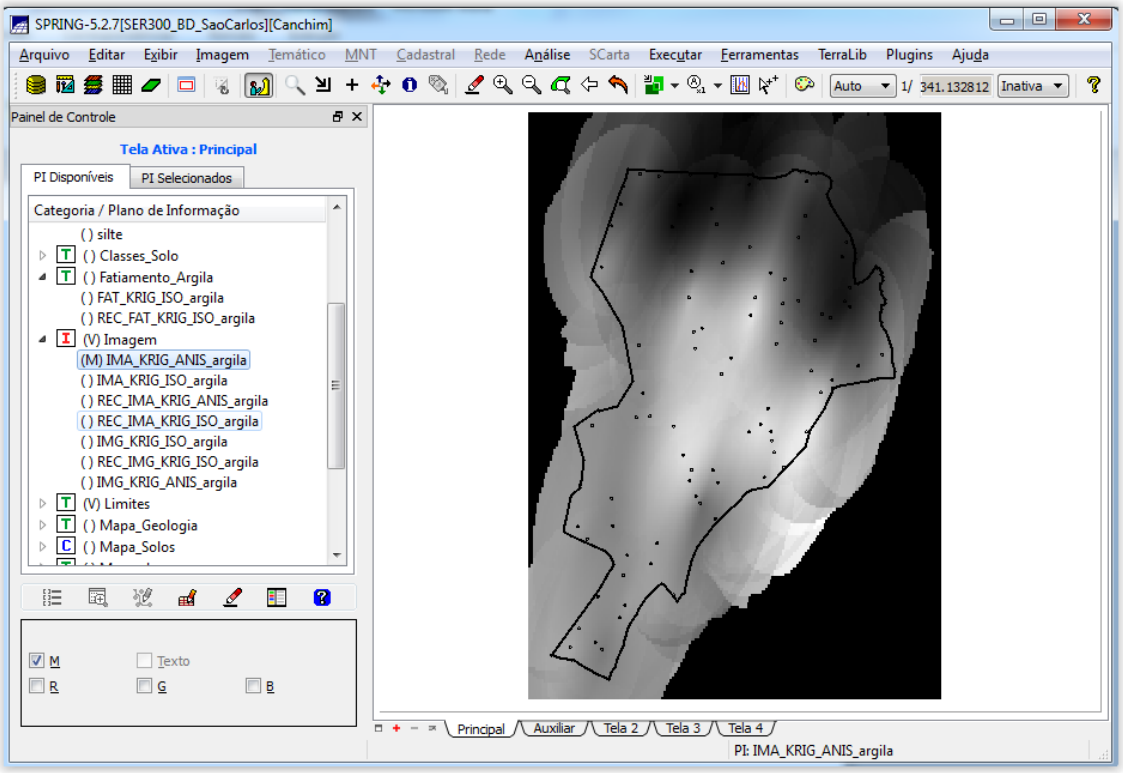
Exercício 13 – Interpolação por krigeagem ordinária


Krigeagem
PI Ativo
Nome: argila
Verificar Modelo...
Krigeagem
Tipo: Ordinária
Média:
Definição de Grade
Res. X: 35
Res. Y: 50
Retângulo Envolvente...
Parâmetros de Interpolação
Número de Pontos no Elipsóide de Busca
Mínimo: 4
Máximo: 64
Elipsóide de Busca (Raio e Orientação)
R. Mín.: 12206.6
R. Máx.: 12206.6
Ângulo: 0
Saída
Categoria...
Superficie
Plano de Informação: KRIG_ANIS_argila
Executar
Fechar
Ajuda

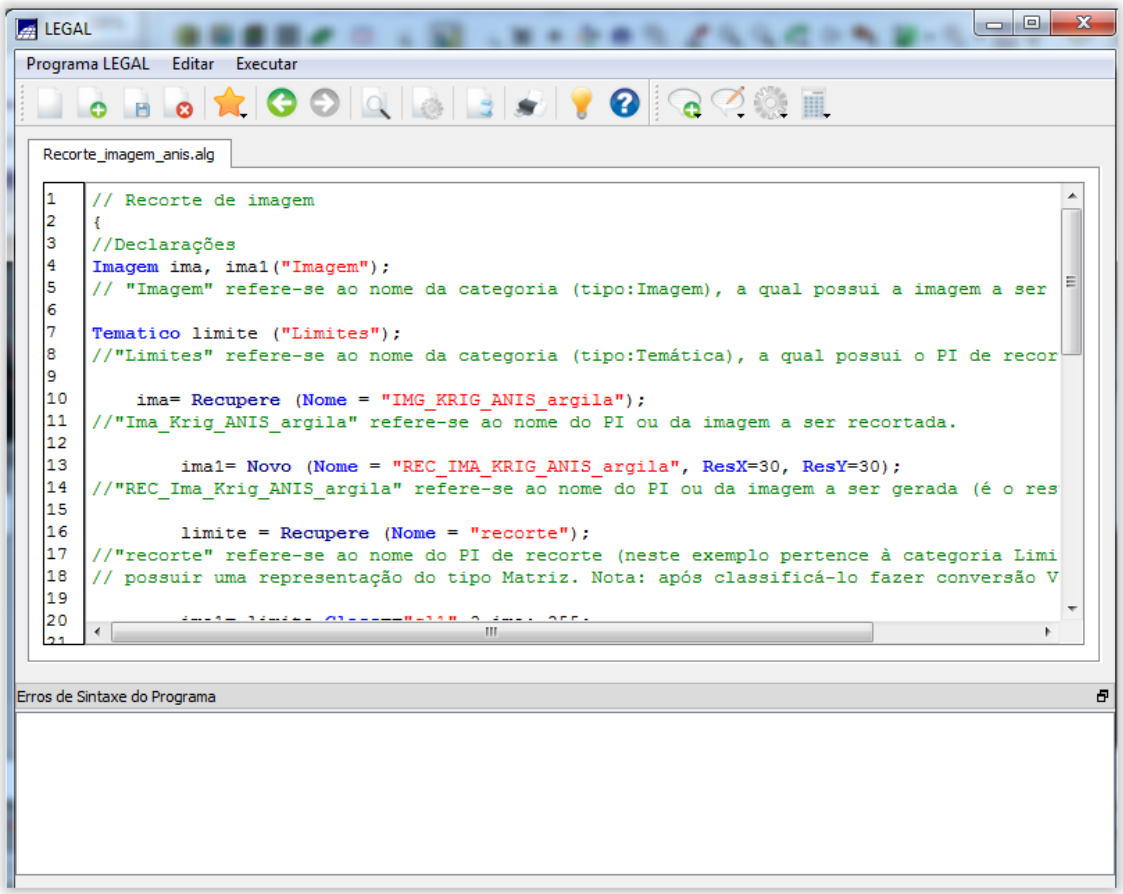

SPRING-5.2.7[SER300_BD_SaoCarlos][Canchim]
Arquivo Editar Exibir Imagem Temático MNT Cadastral Rede Análise SCarta Executar Ferramentas TerraLib Plugins Ajuda
Painel de Controle
Tela Ativa : Principal
PI Disponíveis
PI Selecionados
Categoria / Plano de Informação
(V) Amostras_Campo
( ) Classes_Solo
(V) Fatiamento_Argila
( ) Imagem
(V) Limites
( ) Mapa_Geologia
( ) Mapa_Solos
( ) Mapa_drenagem
( ) Mapa_vias
(V) Superficie
( ) KRIG_ISO_argila
( ) KRIG_ISO_argila_KV
(Glm) KRIG_ANIS_argila
( ) KRIG_ANIS_argila_KV
Amostras
Isolinhas
Grade
Texto
TIN
Imagem
Principal
Auxiliar
Tela 2
Tela 3
Tela 4
PI: KRIG_ANIS_argila

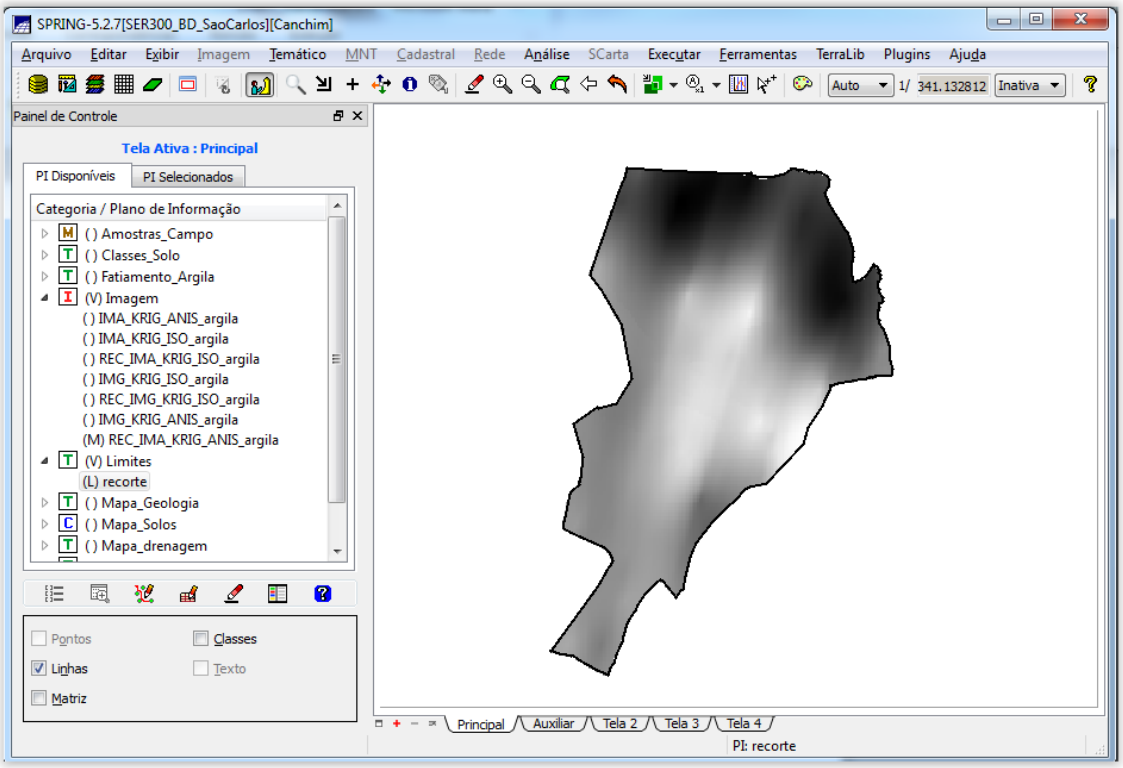
Exercício 14 – Visualização da superfície de argila oriunda do modelo anisotrópico



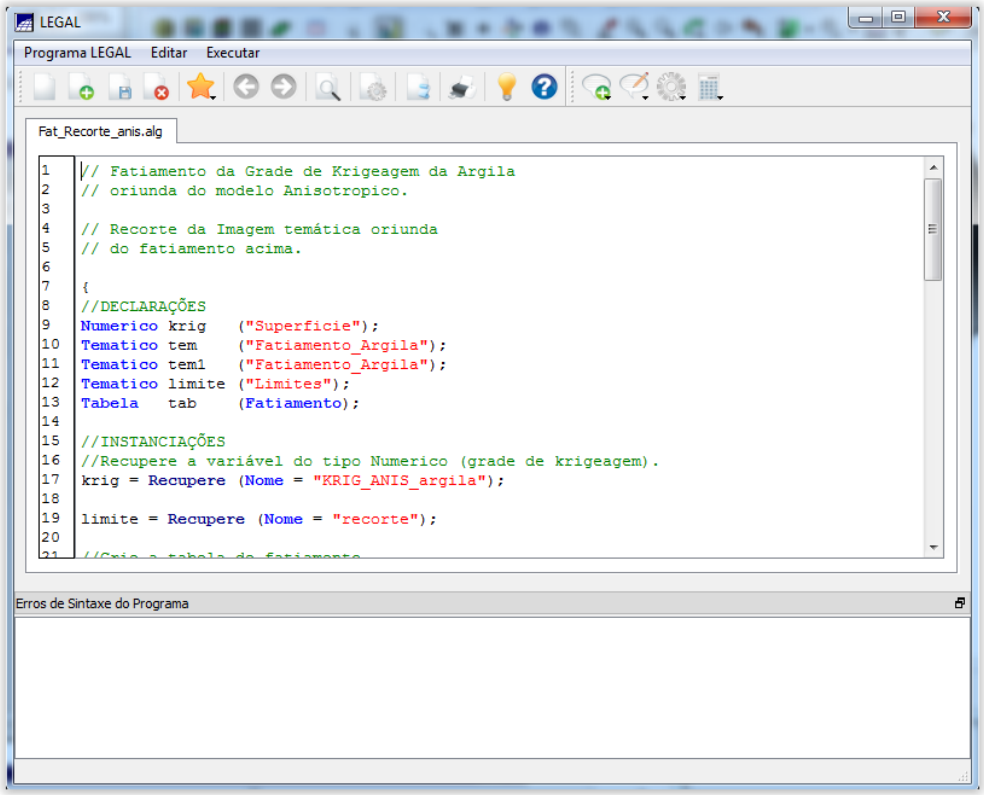


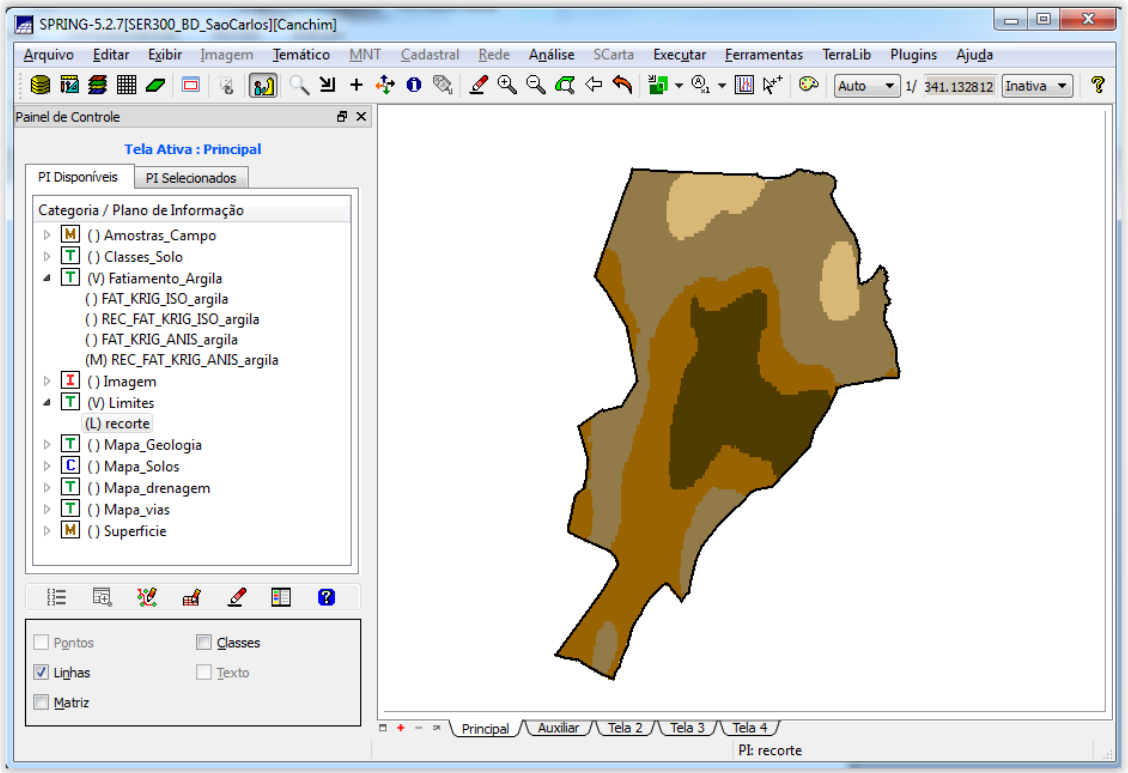
Executando o recorte na imagem:


LEGAL
Programa LEGAL
Editar
Executar
Recorte_imagem_anis.alg
// Recorte de imagem
{
//Declarações
Imagem ima, ima1("Imagem");
// "Imagem" refere-se ao nome da categoria (tipo:Imagem), a qual possui a imagem a ser
Tematico limite ("Limites");
//"Limites" refere-se ao nome da categoria (tipo:Temática), a qual possui o PI de recor
ima= Recupere (Nome = "IMG_KRIG_ANIS_argila");
//"Ima_Krig_ANIS_argila" refere-se ao nome do PI ou da imagem a ser recortada.
ima1= Novo (Nome = "REC_IMA_KRIG_ANIS_argila", ResX=30, ResY=30);
//"REC_Ima_Krig_ANIS_argila" refere-se ao nome do PI ou da imagem a ser gerada (é o res
limite = Recupere (Nome = "recorte");
//"recorte" refere-se ao nome do PI de recorte (neste exemplo pertence à categoria Limi
// possuir uma representação do tipo Matriz. Nota: após classificá-lo fazer conversão V
Erros de Sintaxe do Programa

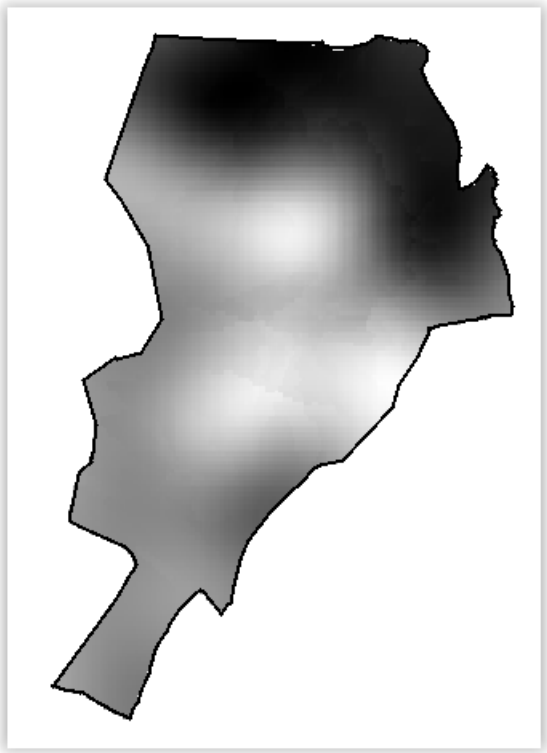

SPRING-5.2.7[SER300_BD_SaoCarlos][Canchim]
Arquivo
Editar
Exibir
Imagem
Temático
MNT
Cadastral
Rede
Análise
SCarta
Executar
Ferramentas
TerraLib
Plugins
Ajuda
Painel de Controle
Tela Ativa : Principal
PI Disponíveis
PI Selecionados
Categoria / Plano de Informação
( ) Amostras_Campo
( ) Classes_Solo
( ) Fatiamento_Argila
(V) Imagem
( ) IMA_KRIG_ANIS_argila
( ) IMA_KRIG_ISO_argila
( ) REC_IMA_KRIG_ISO_argila
( ) IMG_KRIG_ISO_argila
( ) REC_IMG_KRIG_ISO_argila
( ) IMG_KRIG_ANIS_argila
(M) REC_IMA_KRIG_ANIS_argila
(V) Limites
(L) recorte
( ) Mapa_Geologia
( ) Mapa_Solos
( ) Mapa_drenagem
Pontos
Classes
Linhas
Texto
Matriz
Principal
Auxiliar
Tela 2
Tela 3
Tela 4
PI: recorte

Executando o fatiamento e o recorte na grade de Krigeagem oriunda do modelo anisotrópico:





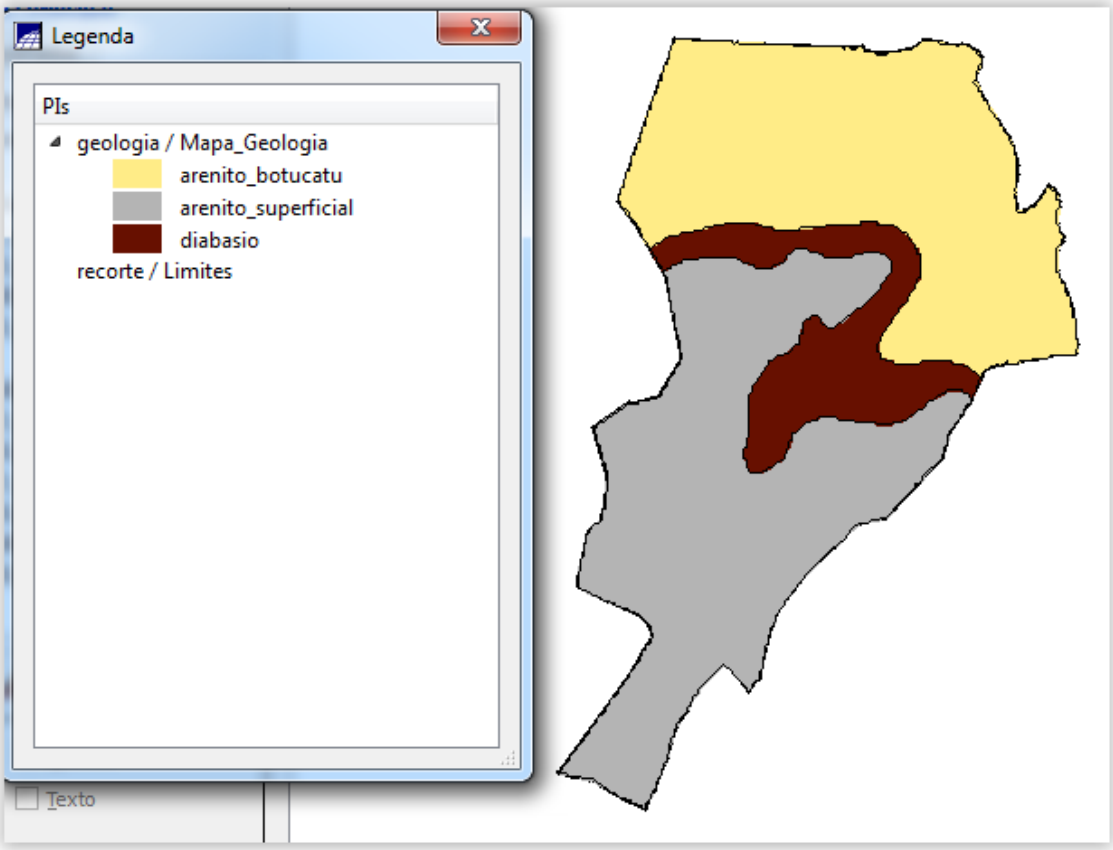
Exercício 15 – Análise dos Resultados



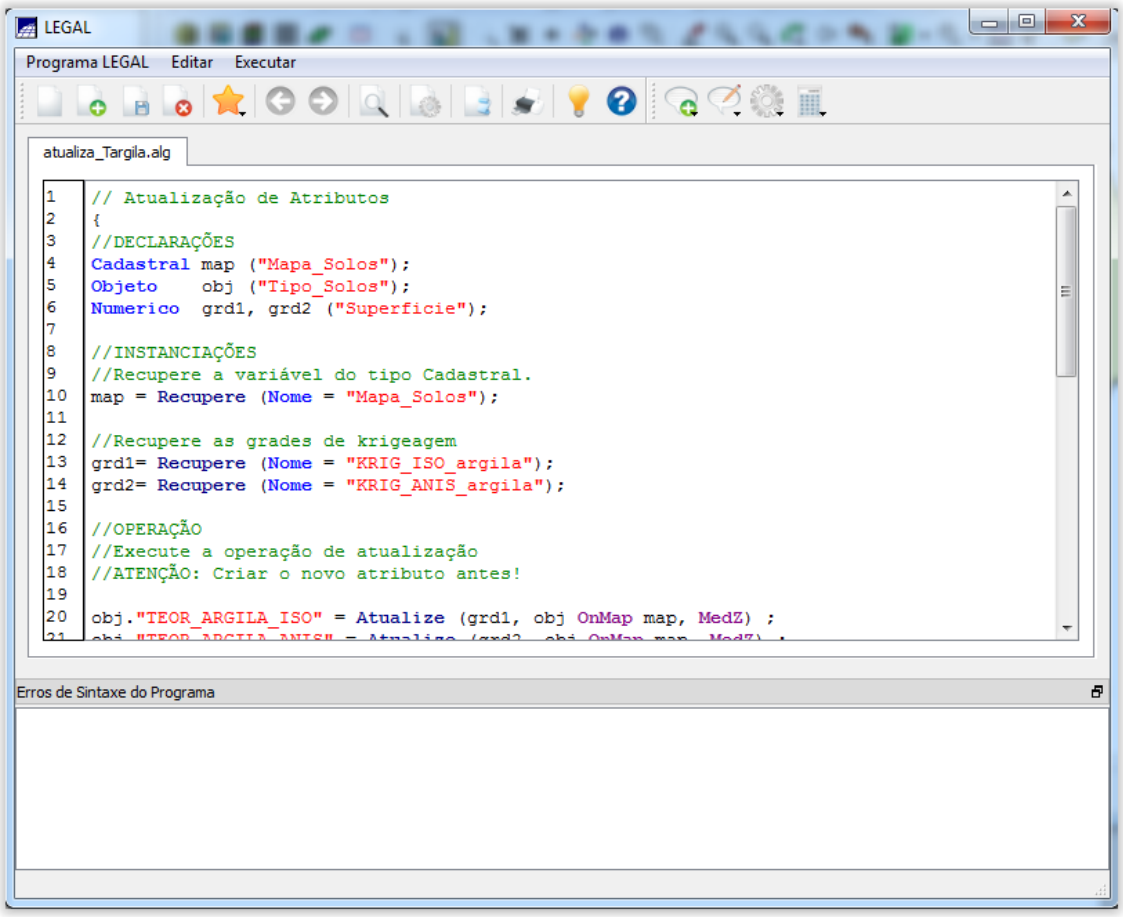
Isotrópico

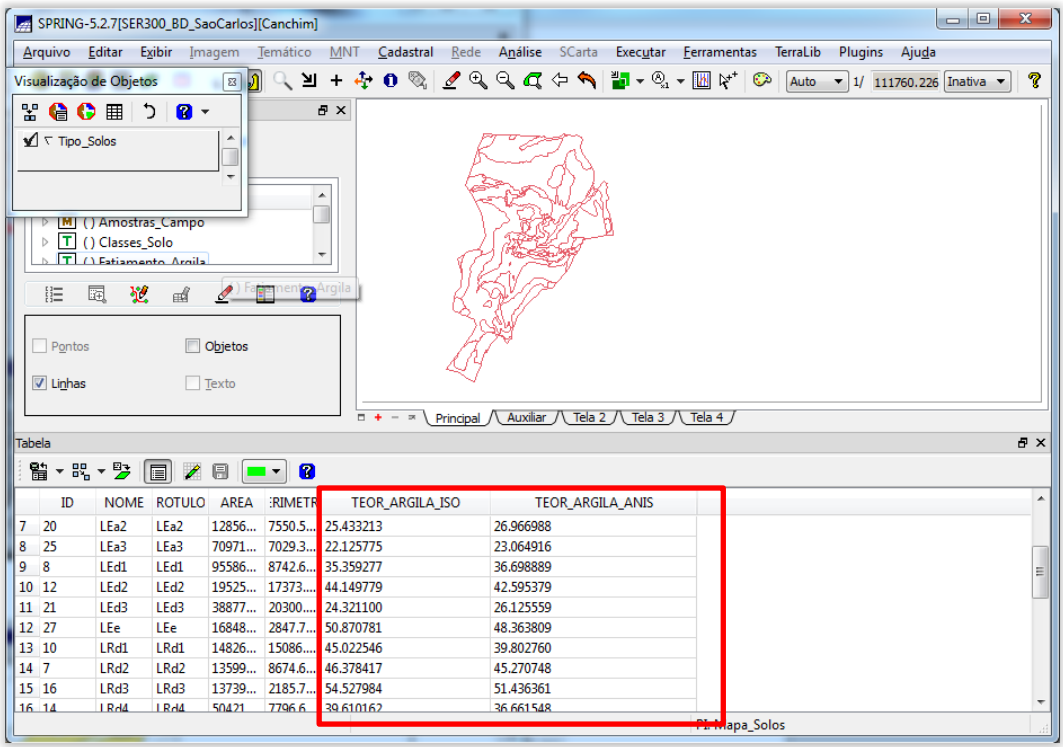
Anisotrópico

Mapa geológico da região:

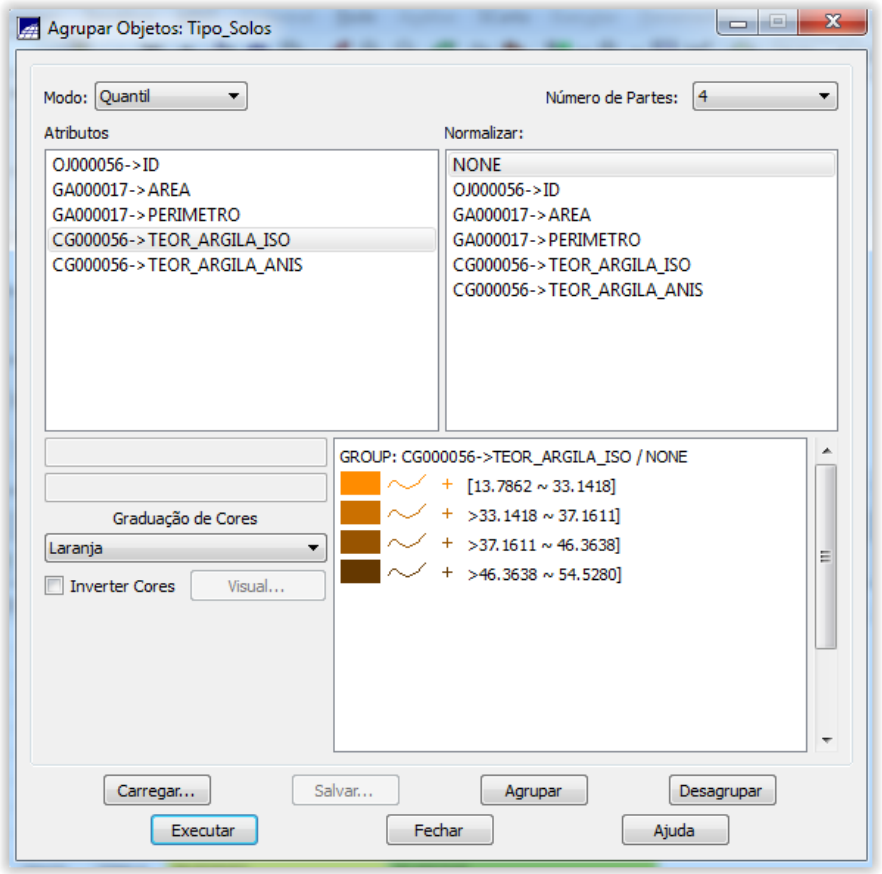


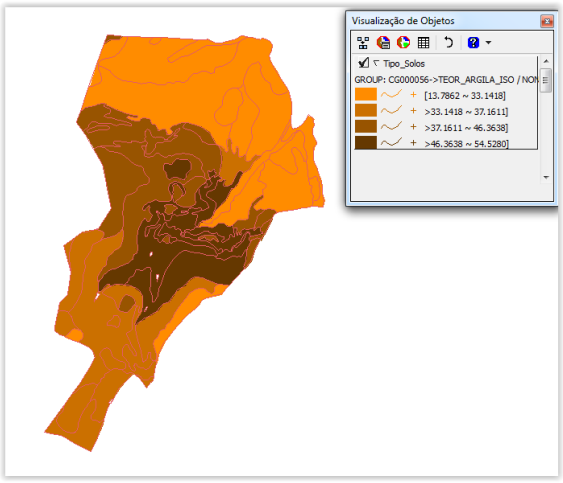
Computando o teor médio de argila para cada classe de solo, a partir das superfícies isotrópicas e anisotrópicas, e atualizar a tabela de atributos:



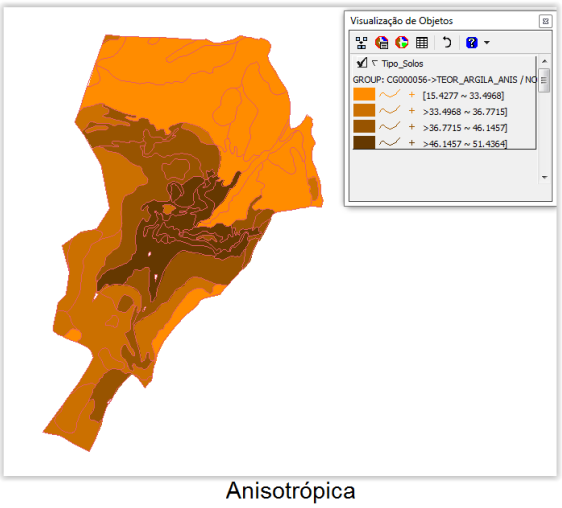


Agrupando por quantil:





Isotrópica



Anisotrópica