DIRETORIA DE PESQUISA E PÓS-GRADUAÇÃO
COORDENAÇÃO DE PESQUISA E PÓS-GRADUAÇÃO
CONCURSO PARA PÓS-GRADUAÇÃO *STRICTO SENSU* – 2006

PROVA DE CONHECIMENTOS ESPECÍFICOS

PROVA DE INGLÊS

TEXT I

Human Impacts on the Biogeochemical Cycles

(adapted from http://wps.prenhall.com/esm_wright_envisci_9/0,9215,1406699-content,00.utf8.html)

Biogeochemical cycles describe the movement and transformation of chemical substances through the global environment. Humans impact these cycles in many ways. Sometimes the change arises because of the ways that humans have altered the face of the planet, through the building of cities and widespread agriculture. Other changes arise because of human additions to, or removal of, substances from the environment. In a sense, biogeochemical cycles provide simple conceptual models that help us understand the sources, pathways, and sinks of natural materials—and the implications of human intervention in those cycles.

The following examples illustrate this point. Sometimes humans impact biogeochemical cycles by changing the rates at which materials move from one stage to another. An example of this can be found in the carbon cycle. In undisturbed ecosystems, large quantities of carbon are tied up in biological tissues and are released again into the atmosphere only when the organism dies and its tissues decay. However, when human activities affect the way the system operates—for instance, through the cutting or the burning of forests—the rate at which organisms die and carbon is released into the atmosphere increases greatly. Another example comes from the phosphorus cycle. In nature, phosphorus enters lakes and streams gradually as phosphorus is released from rock weathering and decay of biological tissue. Rock weathering in particular is a very slow process. Human activities such as phosphate extraction for fertilizer manufacture greatly increase the rate at which mineral phosphorus becomes available for biological processes.

In agricultural systems, clearance of the natural vegetative cover and planting of simpler plant ecosystems contributes to the smoothness of the landscape and increases the rate at which water and dissolved nutrients like phosphorus can move through and over soils to reach waterways. In other cases, human activities actually add new sources to a biogeochemical cycle. The best example of this can be found in the nitrogen cycle, where human manufacture of fertilizer creates new sources of some nitrogen compounds. These fertilizers are not naturally occurring substances (as in the case of phosphate fertilizers) but rather are new products formed from raw materials containing nitrogen. So, although these processes do not create new nitrogen, they do fundamentally change the proportions of nitrogen compounds in the cycle.

TEXT II

Biogeochemical Cycles

(McGuire, A.D. and Lukina, N.V.)

(adapted from http://neespi.org/science/NEESPI_SP_chapters/SP_Chapter_3.2.pdf)

While the direct effects of biogeochemical cycles on the climate system and human societies can generally be elucidated in terms of the carbon cycle, cycles of other elements interact with the dynamics of the carbon cycle and are also important to understand. Nitrogen is an important element in the chemical structure of enzymatic proteins, which are responsible for catalyzing biochemical reactions in organisms. Interactions between carbon and nitrogen dynamics are particularly important to understand because the production of plant biomass in northern ecosystems is generally limited by the availability of nitrogen to plants (Vitousek and Howarth, 1991).

Human activity has modified the global nitrogen cycle in several ways (Vitousek et al. 1997). In particular, fossil fuel burning has released nitrogen- and sulfur-based trace gases into the atmosphere, which are being deposited into terrestrial ecosystems. Increased N availability associated with N deposition may cause an increased rate of soil organic matter accumulation due to an increased biomass and litter production combined with reduced decomposition of organic matter (Berg and Matzner, 1997). However, N fertilization in N deficient forests delays the hardening-off process, resulting in increased winter damage, and thus negating some of the growth enhancement (Makipaa et al. 1999). Increasing CO2 levels may also be affecting the interactions between carbon and nitrogen as N concentration in hardwood leaf litter is reduced when plants are raised in an elevated CO2 atmosphere (Cotrufo et al. 1998). Interactions of the carbon cycle with other elements are also important to understand. Atmospheric pollution can have impacts on plant productivity (Roose et al., 1982; Scholz et al., 1989; Tingey and Andersen, 1991; Gravenhorst et al., 2000), for example, through the effects of elevated levels of tropospheric ozone and sulfur dioxides in decreasing photosynthesis. Also, the deposition of heavy metals has had dramatic impacts on vegetation downwind from smelters (Johansson et al. 2001).

Thus, it is important to develop an understanding of the processes and interactions responsible for patterns and variability of biogeochemical cycles because this understanding is necessary for being able to diagnose, predict and manage the responses of biogeochemistry to global change. The processes responsible for the responses of biogeochemical dynamics in monitoring studies and manipulation experiments need to be elucidated at a range of temporal and spatial scales.

QUESTIONS

1) According to Text I "*when human activities affect the way the system operates—for instance, through the cutting or the burning of forests—the rate at which organisms die and carbon is released into the atmosphere increases greatly*". The consequence of deforestation directly mentioned in the statement above is:

(a) Hydric scarcity.
(b) Global climate change.
(c) Atmospheric pollution.
(d) Species extinction.
(e) Soil losses.

2) Which of the ideas bellow don´t fit to the concepts discussed in Text II?

(a) Climate changes are related to variability of biogeochemical cycles.
(b) The fossil fuel burning impacts on climate changes can be exclusively explained by carbon dioxide emissions.
(c) N fertilization can impact forests negatively or positively, depending on forest characteristics.
(d) To diagnose, predict and manage the responses of biogeochemistry to global change it is important to understand how other elements interact with the dynamics of the carbon cycle.
(e) The elevation of tropospheric ozone and sulfur dioxides concentrations causes decrease in photosynthesis.

3) Among the following items, chose the one that correctly substitutes the underlined expression in the sentence from Text II "*Atmospheric pollution can have impacts on <u>plant productivity</u>, for example, through the effects of elevated levels of tropospheric ozone*...".

(a) Industrial performance
(b) Vegetable production
(c) Vegetation growth
(d) Agricultural performance
(e) Energy consumption

4) Consider statements I and II:

I. The deposition of heavy metals in fusing facilities interferes dramatically in vegetation.

II. N fertilization in N deficient forests is indicated in environmental recuperation processes.

The reading of Text II leads us to the conclusion that:

(a) Text II content doesn't allow us to analyze the statements above.

(b) Statements I and II are true.

(c) Statements I and II are false.

(d) Only statement I is true.

(e) Only statement II is true.

5) Comparing Texts I and II, choose the best answer:

(a) Text I describes basic general anthropic impacts on biogeochemical cycles while Text II describes specific interactions between carbon and some others cycling elements.
(b) Both texts disregard the importance of human activities in biogeochemical changes.
(c) Neither text mentions the importance of biogeochemical cycles in climate regulation.
(d) Text I and II present conflicting data about anthropic impacts on nitrogen cycle.
(e) Some conceptual knowledge depicted in Text I is necessary in the understanding of Text II.

PROVA DE REDAÇÃO

TEXTO 1

REFLEXÕES SOBRE A CRISE BRASILEIRA (fragmento)

Parte final do pronunciamento de Celso Furtado no 1º Seminário Internacional USP, em 14 de junho de 2000. (www.fundaj.gov.br)

> *Alcançamos, assim, o âmago do problema colocado pelo avanço tecnológico. A orientação assumida por este traduz a necessidade de diversificar o consumo dos países de elevado nível de vida. As inovações nas técnicas de marketing passaram a ter importância crescente. A sofisticação dos padrões de consumo dos países ricos tende a comandar a evolução tecnológica. Só assim se explica o desperdício frenético de bens descartados como obsoletos* ***e as brutais agressões na fronteira ecológica.***

TEXTO 2

De vasta
floresta,
pura e casta,
agora
resta
pouca flora.
Acabou-se a festa
Quando, tora por tora,
moto-serra que castra,
devastando-a, de vasta,
fê-la parca

(SOFFIATI, Aristides. *Depois do princípio e antes do fim*. Campos dos Goytacazes, 1987).

TEXTO 3

Examine o fragmento abaixo, retirado do endereço eletrônico www.planalto.gov.br , no qual apresenta-se a Lei 9.605, de fevereiro de 1998, que "Dispõe sobre as sanções penais e administrativas derivadas de condutas e atividades lesivas ao meio ambiente, e dá outras providências."

Presidência da República
Casa Civil
Subchefia para Assuntos Jurídicos

Presidência da República
Casa Civil
Subchefia para Assuntos Jurídicos

LEI Nº 9.605, DE 12 DE FEVEREIRO DE 1998.

(...)

Seção II

Dos Crimes contra a Flora

Art. 38. Destruir ou danificar floresta considerada de preservação permanente, mesmo que em formação, ou utilizá-la com infringência das normas de proteção:

Pena - detenção, de um a três anos, ou multa, ou ambas as penas cumulativamente.

Parágrafo único. Se o crime for culposo, a pena será reduzida à metade.

Art. 39. Cortar árvores em floresta considerada de preservação permanente, sem permissão da autoridade competente:

Pena - detenção, de um a três anos, ou multa, ou ambas as penas cumulativamente.

Art. 40. Causar dano direto ou indireto às Unidades de Conservação e às áreas de que trata o art. 27 do Decreto nº 99.274, de 6 de junho de 1990, independentemente de sua localização:

Pena - reclusão, de um a cinco anos.

> *§ 1º Entendem-se por Unidades de Conservação de Proteção Integral as Estações Ecológicas, as Reservas Biológicas, os Parques Nacionais, os Monumentos Naturais e os Refúgios de Vida Silvestre. (Redação dada pela Lei nº 9.985, de 18.7.2000)*

TEXTO 4

Apresentam-se abaixo, dados que são parte do relatório que contém os resultados de uma pesquisa quantitativa de opinião pública, realizada pela *Vox Populi*, em âmbito nacional, sobre temas ligados à reformulação do Código Florestal (VOX POPULI, 2000):

> *No Congresso, alguns deputados defendem o aumento do desmatamento da Amazônia, afirmando que irá aumentar a oferta de terras agrícolas e assim contribuir para diminuir a fome dos brasileiros. Você concorda com isso?*

Os resultados da pesquisa foram:

(FONTE: VOX POPULI, 2000. Disponível em http://www.codigoflorestal.com.br/Amazonia/pesquisa/pesquisa03.html).